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Data Administration & Engineering Services

Data Model Tool Use Procedures

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Revision/Change Description History Log

Revision	Date	Revision/Change Description	Pages Affected
Version 1.0		Baseline	N/A
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Version 3.0	10/19/2009	Streamline the guide by replacing duplicate instructions with references to the authoritative standard/procedure documents.	All
Version 4.0	03/08/2010	Add new UDP to capture ANSI/ISO UDP standard element names.	pp. 8, 18
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Version 6.0	01/10/2014	Add new UDP to entity list.	p. 7
Version 6.1	07/09/2014	Update instructions with Erwin V9.5 commands.	pp. 5-10
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Introduction

The data modeling tool provides the necessary documentation and graphical representation of the data requirements to facilitate communication within and among components.

The project data analyst must use the Erwin Data Modeling tool to capture the data design.

- Erwin Data Modeler is used on individual workstations.
- Agency standard Erwin User Defined Properties (UDP) and data model templates (Erwin files) are required starting points for new logical/physical, logical-only, and physical-only models. These templates include the standard UDPs that are required components of all new models.
- Data Administration provides modeling tool software licenses and registration information.

Contact Data Administration (DataAdmin@cms.hhs.gov) for assistance with activities, standard data models and modeling software tools.

The purpose of this document is to:

Provide the set of procedures for creating a new data model; Conceptual or Project Logical Only or Project Logical/Physical or Project Physical Only, using the CMS Standard Data Modeling Tool Erwin. Refer to Appendix A for a definition of the ERwin Model Types.

2. Provide the procedure for incorporating User Defined Properties (UDP's) into an existing Erwin Data Model.

References throughout this document to the Logical Data Design Document and DM OP-xxx are to be found in the Data Management Operating Procedures and Guidelines Document at <http://www.cms.hhs.gov/DataAdmin/>.

1 Creating New Logical-Only or Logical/Physical Data Models

The following references will guide the creation of logical-only or logical/physical data models.

1. For a project logical-only or logical/physical model, refer to Section 1.3.1 Set up the Project Logical Data Model in the Logical Data Design Document and DM OP-005 Operating Procedure for Developing the Logical Data.
2. For a conceptual data model, refer to 1.2.2 Create the Conceptual Data Model in the Logical Design Document and DM OP-003 Operating Procedure for Developing the Conceptual Data Model.

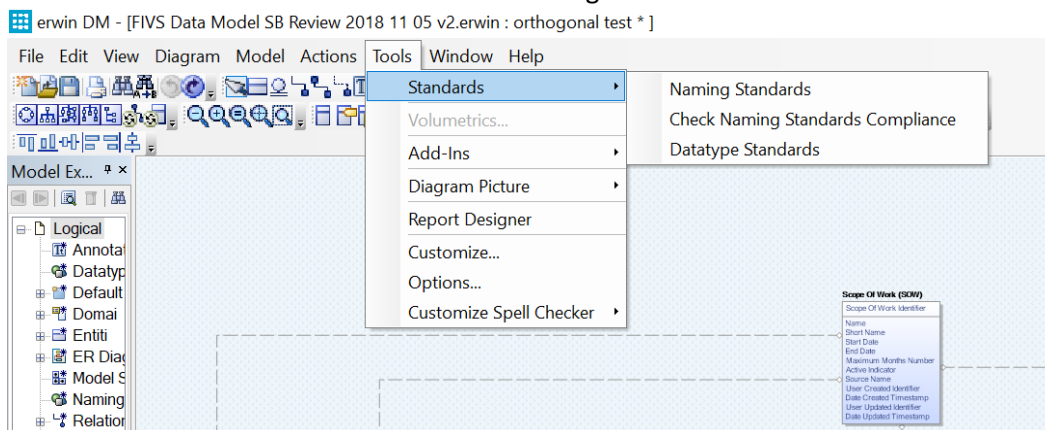
When a modeler is tasked with creating a brand-new project data model, logical-only data model, or logical/physical data model, data model templates (Erwin files) should be used as a starting point to facilitate the introduction of the standard UDPs. The modeler will simply

1. open one of the following models available on the CMS web site, <http://www.cms.hhs.gov/DataAdmin/>, under UDP Templates:
 - a. STD_LDM_UDP Template ErwinVnn.erwin
 - b. STD_LDM_PDM_UDP Template ErwinVnn.erwin
2. Click "Save As" to save the template under the name desired for the new data model. Refer to DM OP-028 Operating Procedure for Naming and Defining Data Models.

The modeler can now open the model created from the template. This model will initially contain no entities, tables, etc. But as a consequence of having used the template as a starting point, every new object that is subsequently added (manually or by using "Complete Compare," the latter being a function that can be accessed through the Tool menu) to the new model will immediately have the correct standard UDPs, ready for whatever entry is relevant. The modeler is thus spared the effort of adding the UDPs to a new data model.

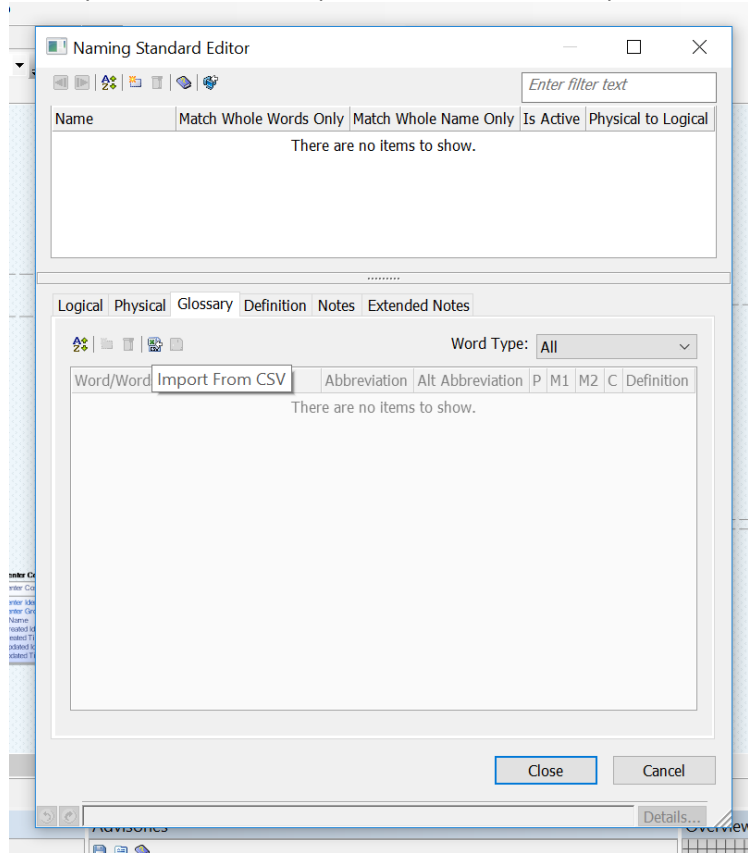
If the model type is an LDM/PDM, import the CSV file to the new model. Always attach the latest published CSV file. (Reference CMS Standard Terms available for download from the CMS web site, <http://www.cms.hhs.gov/DataAdmin/>.) The following procedures should be followed to attach this file to the model.

1. Open the Erwin model.
2. Select the Menu Item Tools > Standards > Naming Standards.



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3. Select the “Glossary” tab and then “Import from CSV.” A file Explorer window is displayed.



4. Select the desired CSV file.

If you are using a version of Erwin previous to 9.0, then follow the same process, but select “Import Other” at the top of the window. A File Explorer window is displayed. Selected the desired NSM file.

To enable Erwin to use the CSV file that has now been attached, complete the following steps.

1. Click “Actions” on the Erwin Tool Bar.
2. Select “Model Naming Options.”
3. Select Name Mapping tab.
4. Check boxes “Use Glossary” for Object Types “Entity to Table,” “Domains,” and “Attribute to Column.”
5. Close Name Mapping panel.

1.1 Capturing Model Level Metadata

The following references will guide the creation of the Model Level Metadata within the ERwin Data Modeling tool.

1. For a project logical data model, refer to 1.3.1 Set up the Project Logical Data Model in the Logical Design Document.
2. For a conceptual data model refer, to 1.2.2 Create the Conceptual Data Model in the Logical Design Document.
3. For all data models, refer to DM OP-031 Operating Procedure for Capturing the Standard Logical Data Model Metadata.
4. For all data models refer to Erwin Documentation.

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Model-Level metadata and the corresponding Erwin Modeling Tool location where this Model-Level metadata must be captured.

CMS Standard Model-Level Metadata	Erwin Model Metadata (Access Path)
Model Name	Model : Model Properties : General : Name
Model Author	Model : Model Properties : General : Author
Model Type	Refer to Section 1 above to select type . Model : Model Properties : General : Type to verify
Model Definition	Model : Model Properties : Definition
Model Version Effective Date	Model : Model Properties : UDP : Model Version Effective Date
Model Central DA Name	Model : Model Properties : UDP : Model Central DA Name
Model Business Owner Name	Model : Model Properties : UDP : Model Business Owner Name
LDM CDA Signoff Date	Model : Model Properties : UDP : Model Business Owner Name
Project Name	Model : Model Properties : UDP : Project Name
Project Release Number	Model : Model Properties : UDP : Project Release Number

1.2 Creating New Entities and Metadata

The following references will guide the creation of the entity-level metadata in the Erwin Data Modeling tool.

1. For all logical models (project/conceptual), refer to 1.4.1 Create New Entities in the Logical Design Document.
2. For all logical data models, refer to DM OP-031 Operating Procedure for Capturing the Standard Logical Data Model Metadata.
3. For all data models, refer to Erwin Documentation.
4. For all data models, refer to DM OP-008 Operating Procedure for Defining Data Entities.
5. For all data models, refer to DM OP-009 Operating Procedure for Naming Data Entities.
6. For conceptual data models, refer to DM OP-003 Operating Procedure for Developing the Conceptual Data Model.
7. For all data models, refer to DM OP-042 Operating Procedure for Modeling Supertypes and Subtypes.

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Entity-Level metadata and the corresponding Erwin Modeling Tool location where this entity-level metadata must be captured.

CMS Standard Entity-Level Metadata	Erwin Entity Metadata (Access Path)
Entity Name	Entity Properties : Name

CMS Standard Entity-Level Metadata	Erwin Entity Metadata (Access Path)
Entity Definition	Entity Properties : Definitions
Entity Requirement ID	Entity Properties : UDP : Entity Requirement ID (Multiple Requirement IDs are separated by semicolons.)
Entity Security Category Description	Entity Properties : UDP : Entity Security Category Description
Logical-Only Entity Indicator	Entity Properties : Logical-Only
Entity ELDM Name	Entity Properties : UDP : Entity ELDM Name
Entity Data Source	Entity Properties : UDP : Entity Data Source

1.3 Creating New Attributes and Metadata

The following references will guide the creation of the attribute-level metadata in the Erwin Data Modeling tool.

1. Sections 1.4.2 Create New Attributes, 1.4.3 Model Derived Data, 1.4.6 Determine Primary Identifiers, and 1.4.8 Define Domain Value Rules in the Logical Design Document
2. DM OP-031 Operating Procedure for Capturing the Standard Logical Data Model Metadata
3. DM OP-010 Operating Procedure for Defining Data Attributes
4. DM OP-011 Operating Procedure for Analyzing Types of Data Attributes
5. DM OP-012 Operating Procedure for Naming Data Attributes

For all data models, refer to ERwin Documentation.

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Attribute-Level metadata and the corresponding ERwin Modeling Tool location where this Attribute Level metadata must be captured.

CMS Standard Attribute-Level Metadata	Erwin Attribute Metadata (Access Path)
Attribute Name	Attribute Properties : General : Attribute Name
Attribute Definition	Attribute Properties : General : Definition
Attribute Domain Name	Attribute Properties : General : Parent Domain
Attribute Logical-Only Indicator	Attribute Properties : General : Logical-Only
Attribute Valid Values	Attribute Properties : General : Constraint Check Constraints : Validation Rule Error : Valid Value Attribute Properties : UDP : Attribute Valid Values
Attribute Required Indicator	Attribute Properties : General : Null Option
Attribute Primary Key Indicator	Attribute Properties : General : Primary Key
Attribute Derivation Text	Attribute Properties : UDP : Attribute Derivation Text
Attribute Requirement ID	Attribute Properties : UDP : Attribute Requirement ID (Multiple Requirement IDs are separated by semicolons.)
Attribute Data Source Name	Attribute Properties : UDP : Attribute Data Source Name (Multiple Source Names are separated by semicolons.)
Attribute Alias Name	Attribute Properties : UDP : Attribute Alias Name (Multiple Alias Names are separated by semicolons.)
Attribute ELDM Name	Attribute Properties : UDP : Attribute ELDM Name

CMS Standard Attribute-Level Metadata	Erwin Attribute Metadata (Access Path)
ANSI/ISO Standard Element Name	Attribute Properties : UDP : ANSI/ISO Standard Element Name (Multiple pairs of Standard Element Names are separated by semicolons.)
Attribute Personally Identifiable Information (PII)	Attribute Properties : UDP : Personally Identifiable Information

1.4 Creating New Relationships and Metadata

The following references will guide the creation of the Relationship Metadata in the Erwin Data Modeling tool.

1. 1.4.5 Define Relationships in the Logical Design Document
2. 1.2.2 Create the Conceptual Data Model in the Logical Design Document
3. 1.4.4 Identify and Model Supertypes and Subtypes in the Logical Design Document
4. DM OP-015 Defining Relationships, Cardinality and Optionality

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Relationship-Level metadata and the corresponding ERwin Modeling Tool location where this Relationship-Level metadata must be captured.

CMS Standard Relationship-Level Metadata	Erwin Attribute Metadata (Access Path)
Relationship Parent-to-Child Verb	Model : Relationship : General : Verb : Phrase : Parent-to-Child
Relationship Cardinality	Model : Relationship : General : Relationship Cardinality : Cardinality
Relationship Optionality	Model : Relationship : General : Relationship Cardinality : Relationship Type
Relationship Definition	Model : Relationship : Definition

2 Creating PDM for LDM/PDM Data Model

Erwin will automatically generate the PDM version of the LDM. To change the model view, click “Physical Model” on the “Model” menu. The CSV file referenced in Section 1 will generate a first-cut physical name from the entity and attribute logical name on the LDM side of the data model for all tables and columns. The results may not be consistent with the selected DBMS. Therefore, it will be necessary to review the names that have been generated automatically to ensure compliance with the standards for naming tables and columns.

If physical-only tables and/or columns are added to the physical view of an LDM/PDM data model, then the following procedures apply.

2.1 Creating New Tables and Metadata

Refer to 3.2 Creating New Tables and Metadata of Section 3 Creating New Physical Data Models Using ERwin.

2.2 Creating New Columns and Metadata

Refer to 3.3 Creating New Columns and Metadata of Section 3 Creating New Physical Data Models Using ERwin.

2.3 Creating New Relationships and Metadata

Refer to 3.4 Creating New Relationships and Metadata of Section 3 Creating New Physical Data Models Using ERwin.

3 Creating New Physical Data Models Using ERwin

When a modeler is tasked with creating a new project physical only data model, the physical data model template should be used as a starting point to facilitate the introduction of the standard UDPs. The modeler will:

1. Open the following model available on the CMS web site, <http://www.cms.hhs.gov/DataAdmin/>, under Downloads-UDP Templates:
 - a. STD_PDM_UDP Template ErwinVnn.erwin
2. Do a "Save As" in order to save the template under the name desired for the new data model. Refer to DM OP-028 Operating Procedure for Naming and Defining Data Models.

The modeler can now open the model just created from the template. This model will initially contain no tables, etc. But as a consequence of having used the template as a starting point, every new object that is subsequently added (manually or by using "Complete Compare") to the new model will immediately have the correct standard UDPs, ready for whatever entry is relevant. The modeler is thus spared the adding the UDPs to a new data model.

3.1 Capturing Model Level Metadata

The following references will guide the creation of the model-level metadata in the Erwin Data Modeling tool.

1. For all data models, refer to DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata.
2. For all data models, refer to Erwin Documentation.

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Model-Level metadata and the corresponding ERwin Modeling Tool location where this Model Level metadata must be captured.

CMS Standard Model-Level Metadata	Erwin Model Metadata (Access Path)
Model Name	Model : Model Properties : General : Name
Model Author	Model : Model Properties : Author
Model Type	Refer to Section 1 above.
Model Definition	Model : Model Properties : Definition
Model Version Effective Date	Model : Model Properties : UDP : Model Version Effective Date
Model Central DA Name	Model : Model Properties : UDP : Model Central DA Name
Model Business Owner Name	Model : Model Properties : UDP : Model Business Owner Name
Model Central DBA Name	Model : Model Properties : UDP : Model Central DBA Name
Model Local DBA Name	Model : Model Properties : UDP : Model Local DBA Name
Project Name	Model : Model Properties : UDP : Project Name
Project Release Number	Model : Model Properties : UDP : Project Release Number

3.2 Creating New Tables and Metadata

The following references will guide the creation of the table-level metadata in the Erwin Data Modeling tool.

1. DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata
2. ERwin Documentation
3. DM OP-045 Operating Procedure for Constructing Physical Table or File Names

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Table-Level metadata and the corresponding ERwin Modeling Tool location where this Table-Level metadata must be captured.

CMS Standard Table-Level Metadata	Erwin Table Metadata (Access Path)
Table Name	Model : Tables : Name
Table Comment	Model : Tables : Comment
Physical-Only Table Indicator	Model : Tables : Physical-Only
Logical Entity Equivalent Name	Model : Tables : UDP : Logical Entity Equivalent Name
Table Requirement ID	Model : Tables : UDP : Table Requirement ID (Multiple Requirement IDs are separated by semicolons.)
Table Security Category Description	Model : Tables : UDP : Table Security Category Description
Logical Entity Name	Model : Tables : UDP : Logical Entity Name (Multiple Entity Names are separated by semicolons.)

3.3 Creating New Columns and Metadata

The following references will guide the creation of the column-level metadata in the ERwin Data Modeling tool.

1. For all data models, refer to DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata.
2. For all data models, refer to ERwin Documentation.
3. Refer to DM OP-046 Operating Procedure for Constructing Physical Column or Element names.
4. Refer to DM OP-041 Operating Procedure for Assigning Date Formats.

Additionally, for all data models, on the UDP Tab, enter the content for required Model UDPs. Refer to DM OP-031 Standard Metadata Matrix.

The following table identifies the CMS Standard Column-Level and the corresponding ERwin Modeling Tool location where this Column- Level metadata must be captured.

CMS Standard Column-Level Metadata	Erwin Column Metadata (Access Path)
Column Name	Model : Columns : New : Column Name
Column Comment	Model : Columns : Comment
Column Domain Name	Model : Columns : General : Domain
Column Null Option	Model : Columns (Database) : Null Option
Physical-Only Column Indicator	Model : Columns : General : Physical-Only
Primary Key Indicator	Model : Columns : General : Primary Key
Column Data Source Name	Model : Columns : UDP : Column Data Source Name (Multiple Source Names are separated by semicolons.)
Column Requirement ID	Model : Columns : UDP : Column Requirement ID (Multiple Requirement IDs are separated by semicolons.)
Column Derivation Text	Model : Columns : UDP : Column Derivation Text
Logical Attribute Name	Model : Columns : UDP : Logical Attribute Name (Multiple Attribute Names are separated by semicolons.)

3.4 Creating New Relationships and Metadata

The following references will guide the creation of the relationship-level metadata in the Erwin Data Modeling tool.

- For all data model, refer to Erwin Documentation.

4 Incorporating User Defined Properties (UDP's) into existing Data Models

The following references will guide the creation of the UDP's into an existing data model.

- For all data models Refer to ERwin Documentation

In addition to the procedures referenced in the Erwin documentation, it is recommended that you first **make a copy** of the Erwin data model into which you wish to import UDPs. Then, immediately **rename** this copy to clearly indicate that it is the target data model that will be used in the import attempt. This will preserve the original data model in case something unwanted happens to the target data model during the Complete Compare work.

For the "Compare Current Model with," use model UDP template, named

- Std_PDM_UDP_Template ErwinVnn for physical-only models,
- Std_LDM_UDP_Template ErwinVnn for logical-only models, and
- Std_LDM_PDM_UDP_Template ErwinVnn for logical/physical models.

Appendix A: Erwin Model Type Definitions

Erwin Data Model Type	Definition of the Type of Erwin Data Model
Logical-Only	A type of Erwin data model that exists for the express purpose of representing business information and defining business rules. This could be the project logical data model or a conceptual data model.
Physical-Only	A type of Erwin data model that exists for the express purpose of focusing on the physical implementation of the logical data model in a database.
Logical/Physical (Logical View)	A type of Erwin data model that automatically includes both a logical and physical data model. This is made possible by the user's ability to toggle between a "Logical View" and a "Physical View" of the same data model. The "Logical View" exists primarily for the purpose of representing business information and defining business rules. The "Logical View," however, also typically serves as the starting point for the "Physical View."
Logical/Physical (Physical View)	A type of Erwin data model that automatically includes both a logical and a physical model. This is made possible by the user's ability to toggle between a "Logical View" and a "Physical View" of the same data model. The "Physical View" exists primarily for the purpose of depicting the physical implementation of the "Logical View" of the data model in a database.