DEPARTMENT OF HEALTH & HUMAN SERVICES
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Central Data Administration

Data Model Tool Use Procedure

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Revision\Change Description History Log

Revision	Date	Revision\Change Description	Pages Affected
Version 1.0		Baseline	N/A
Version 2.0	07/02/2008	Revised entire document to include reference to NEW User Defined Properties	All
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	Added new UDP to capture ANSI/ISO UDP standard element names	8 & 18

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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.

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), 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.
- IDEF1X notation is the required standard within CMS.
- 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:

1. 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.

1. Procedure: 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 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 a conceptual data model refer to DM OP-003 Operating Procedure for Developing the Conceptual Data Model
4. For a project logical only or logical/physical model refer to DM OP-005 Operating Procedure for Developing the Logical Data Model

When a modeler is tasked with creating a brand-new project data model; Logical Only or Logical/Physical, data model templates (ERwin files) should be used as a starting point to facilitate the introduction of the standard UDPs. Depending on the version of the ERwin modeling tool the modeler will simply:

1. Open up one of the following models available on the CMS web site. http://www.cms.hhs.gov/DataAdmin/ under Downloads-UDP Templates
   a. STD_LDM_UDP Template v ‘nn’.er1
   b. STD_LDM_UDP Template v ‘nn’.erwin
   c. STD_LDM_PDM_UDP Template v ‘nn’.er1
   d. STD_LDM_PDM_UDP Template v ‘nn’.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 just 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 later is 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 having to add the UDPs to a new data model.

If the model type is an LDM/PDM attach the .nsm file to the new model. Always attach the latest published .nsm 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. Click “TOOLS” on the ERwin Tool Bar
2. Select “NAME” and click “Model Naming Options”
3. Select General Tab

4. Click “Use File” then enter the path to the .nsm file on your computer, alternatively you can select “Browse” to assist in finding the file, and then Click “Set”
5. Select “Name Mapping” tab
6. Check boxes “Use Gloss” for entity to table, domains, and attribute to column
7. Click “OK”

1.1. Procedure: 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 the following should be annotated for all data models:
On the UDP Tab enter the content for required Model UDPs. Refer to Appendix B

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
Model Definition	Model:Model Properties:**Definition**
Model Create Date	Model:Model Properties:UDP:**Model Create Date**
Model Central DA Name	Model:Model Properties:UDP:**Model Central DA Name**
Model Business Contact Name	Model:Model Properties:UDP:**Model Business Contact Name**
LDM DA Signoff Date	Model:Model Properties:UDP:**LDM DA Signoff Date**
LDM Last Change Description	Model:Model Properties:UDP: **LDM Last Change Description**
Model Central DBA Name	Model:Model Properties:UDP: **Model Central DBA Name**
PDM Last Change Description	Model:Model Properties:UDP**: PDM Last Change Description**
Model Local DBA Name	Model:Model Properties:UDP: **Model Local DBA Name**
PDM DA Signoff Date	Model:Model Properties:UDP: **PDM DA Signoff Date**

1.2. Procedure: 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 G-019 Guideline for Modeling Supertypes and Subtypes

Additionally the following should be annotated for all data models:
On the UDP Tab enter content for required Entity UDPs. Refer to Appendix B

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	Model:Entities:**Name**
Entity Definition	Model:Entities:**Definition**
Entity Requirement ID	Model:Entities:UDP:**Requirement** ID (multiple Requirement IDs are separated by semicolons)
Entity Security Category Description	Model:Entities:UDP:**Entity Security Category Description**
Logical Only Entity Indicator	Model:Entities:**Logical Only**
Entity Business Contact Name	Model:Entities:UDP:**Entity Business Contact Name**
Entity CDA Standard Name	Model:Entities:UDP:**Entity CDA Standard Name**
Physical Table Name	Model:Entities:UDP:**Physical Table Name** (multiple Table Names are separated by semicolons)

1.3. Procedure: Creating New Attributes and Metadata

The following references will guide the creation of the Attribute Level Metadata in the ERwin Data Modeling tool.

1. Refer to 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. Refer to DM OP-031 Operating Procedure for Capturing the Standard Logical Data Model Metadata
3. Refer to DM OP-010 Operating Procedure for Defining Data Attributes
4. Refer to DM OP-011 Operating Procedure for Analyzing Types of Data Attributes
5. Refer to DM OP-012 Operating Procedure for Naming Data Attributes
6. For all data models refer to ERwin Documentation

Additionally the following should be annotated for all data models:
On the UDP Tab enter the required Attribute UDPs. Refer to Appendix B

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	Model:Attributes:New:**Attribute Name**
Attribute Definition	Model:Attributes:**Definition**
Attribute Domain Name	Model:Attributes:General:**Domain**
Attribute Logical Only Indicator	Model:Attributes:General:**Logical Only**
Attribute Valid Values	Model:Attributes:Data Type: **Valid** Model:Attributes:Constraint:**Valid** (ERwin V 7)
Attribute Required Indicator	Model:Attributes:Data Type:**Required** Model:Attributes:Data Type:**Not Null** (ERwin V7)
Attribute Primary Key Indicator	Model:Attributes:General:**Primary Key**
Attribute Derivation Text	Model:Attributes:UDP**:Attribute Derivation Text**
Attribute Requirement ID	Model:Attributes:UDP:**Attribute Requirement ID** (multiple Requirement IDs are separated by semicolons)
Attribute Data Source Name	Model:Attributes:UDP:**Attribute Data Source Name** (multiple Source Names are separated by semicolons)
Physical Column Name	Model:Attributes:UDP:**Attribute Physical Column Name** (multiple Column Names are separated by semicolons)
Attribute Alias Name	Model:Attributes:UDP:**Attribute Alias Name** (multiple Alias Names are separated by semicolons)
Attribute CDA Standard Name	Model:Attributes:UDP:**Attribute CDA Standard Name**
ANSI/ISO Standard Element Name	Model:Attributes:UDP:**ANSI/ISO Standard Element Name** (multiple pairs of Standard Element Names are separated by semicolons.)

1.4. Procedure: Creating New Relationships and Metadata

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

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

The following table identifies the required 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 Name	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**

2. Procedure: 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 .nsm file referenced in Section 1.0 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. Procedure: 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. Procedure: 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. Procedure: 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. Procedure: 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. Depending on the version of the ERwin modeling tool the modeler will:

1. Open up one of the following models available on the CMS web site. http://www.cms.hhs.gov/DataAdmin/ under Downloads-UDP Templates
   a. STD_PDM_UDP Template ErwinV4.er1
   b. STD_PDM_UDP Template ErwinV7.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 effort of having to add 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 the following should be annotated for all data models: On UDP Tab enter the content for required Model UDPs. Refer to Appendix B

The following table identifies the CMS Standard Model-Level metadata that is required 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
Model Definition	Model:Model Properties:**Definition**
Model Create Date	Model:Model Properties:UDP:**Model Create Date**
Model Central DA Name	Model:Model Properties:UDP:**Model Central DA Name**
Model Business Contact Name	Model:Model Properties:UDP:**Model Business Contact Name**
PDM Last Change Description	Model:Model Properties:UDP**: PDM Last Change Description**
Model Central DBA Name	Model:Model Properties:UDP**: Model Central DBA Name**
Model Local DBA Name	Model:Model Properties:UDP: **Model Local DBA Name**
PDM DA Signoff Date	Model:Model Properties:UDP: **PDM DA Signoff Date**

3.2. Procedure: Creating New Tables and Metadata

The following references will guide the creation of the Table Level Metadata in the ERwin Data Modeling tool.

1. Refer to DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata
2. Refer to ERwin Documentation
3. Refer to DM G-010 Guideline for Constructing Physical Table or File Names

Additionally the following should be annotated for all data models: On UDP Tab enter the content for required Model UDPs. Refer to Appendix B

The following table identifies the CMS Standard Table-Level metadata that is required 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. Procedure: 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 G-011 Guideline for Constructing Physical Column or Element names
4. Refer to DM G-006 Standard for Assigning Date Formats.

Additionally the following should be annotated for all data models: On UDP Tab enter the content for required Model UDPs. Refer to Appendix B

The following table identifies the CMS Standard Column-Level metadata that is required 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**
Logical Attribute Equivalent Name	Model:Columns:UDP: **Logical Attribute Equivalent Name**
Column Data Source Name	Model:Columns:UDP: **Column Data Source Name** (multiple Sopurce 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. Procedure: 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 models Refer to ERwin Documentation

4. Procedure: 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 that you wish to import UDPs into. 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" for Physical Only Models

"Std_LDM_UDP_Template" for Logical Only Models

"Std_LDM_PDM_Template" for Logical/Physical Models

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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 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 "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.

Appendix B Standard User Defined Properties (UDP) Matrix by Model Type

User Defined Properties	Logical Only Model	Logical/Physical Model	Physical Only Model	Format/Description
Model-Level				**Refer to DM OP-031 Operating Procedure for Capturing the Standard LDM Metadata** **Refer to DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata**
LDM DA Signoff Date	Required	Required		
Model Business Contact Name	Required	Required	Required	
Model Central DA Name	Required	Required	Required	
Model Create Date	Required	Required	Required	
LDM Last Change Description	Required	Required		
Model Central DBA Name	Required	Required	Required	
Model Local DBA Name		Required	Required	
PDM Last Change Description		Required	Required	
PDM DA Signoff Date		Required	Required	
Entity-Level				**Refer to DM OP-031 Operating Procedure for Capturing the Standard LDM Metadata**
Entity Business Contact Name	Conditional	Conditional		Conditional=Required if different from Model Business Contact Name.
Entity CDA Standard Name	Conditional	Conditional		Conditional=Required if standard name exists and not used.
Entity Requirement ID	Required	Required		
Entity Security Category Description	Required	Required		
Physical Table Name	Required	Conditional		Conditional=Required if corresponding table does not exist.

User Defined Properties	Logical Only Model	Logical/Physical Model	Physical Only Model	Format/Description
Attribute-Level				**Refer to DM OP-031 Operating Procedure for Capturing the Standard LDM Metadata**
Attribute Alias Name	Conditional	Conditional		Conditional=Required if attribute has alias.
Attribute CDA Standard Name	Conditional	Conditional		Conditional=Required if standard name exists and not used.
Attribute Derivation Text	Conditional	Conditional		Conditional=Required if derived attribute.
Attribute Requirement ID	Conditional	Conditional		Conditional=Required if different from Entity Requirement ID.
Physical Column Name	Required	Conditional		Conditional=Required if attribute Logical Only.
Attribute Data Source Name	Required	Required		
ANSI/ISO Standard Element Name	Conditional	Conditional		Conditional=Required if attribute has a corresponding National or International standard element name
Table-Level				**Refer to DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata**
Logical Entity Name			Required	
Logical Entity Equivalent Name		Conditional	Conditional	Conditional=Required if physical only.
Table Requirement ID		Conditional	Required	Conditional=Required If physical only.
Table Security Category Description		Conditional	Required	Conditional=Required if physical only.
Column-Level				**Refer to DM OP-032 Operating Procedure for Capturing the Standard PDM Metadata**
Logical Attribute Equivalent Name		Conditional	Conditional	Conditional=Required if physical only.
Logical Attribute Name			Required	
Column Derivation Text		Conditional	Conditional	Conditional=Required if physical only and derived column.
Column Requirement ID		Conditional	Conditional	Conditional=Required if physical only and different than the Table Requirement ID.

User Defined Properties	Logical Only Model	Logical/Physical Model	Physical Only Model	Format/Description
Column Data Source Name		Conditional	Conditional	Conditional=Required if physical only.