



System Development and Life-Cycle Management (SDLCM) Methodology

Subject Data Modeling	Type	Procedure
	Identifier	P-3101
	Effective Date	February 2002
	Revision No.	2

Approval

CISSCO Program Director

1. PURPOSE

This procedure provides direction for performing data modeling. Data modeling is used to identify the data elements that are read, transformed, or produced to satisfy the Project/Application system requirements. Data modeling is performed concurrently with process modeling and together, the two modeling techniques provide the design of the solution system at the conceptual, logical, and physical levels.

2. APPLICABILITY

Data modeling is required of all Projects subject to the SDLCM Methodology. However, those Projects that involve only the upgrade of an existing data base to a new data base management system may require only regeneration of the physical data model (the schema and data dictionary) from the logical data model.

3. REFERENCE PUBLICATIONS

The following publications contain related information:

- *SDLCM Methodology Handbook*
- SDLCM Methodology Procedure P-3111, Process Modeling
- SDLCM Methodology Standard S-3151, Data Models
- SDLCM Methodology Standard S-3152, Entity Relationship Diagrams
- SDLCM Methodology Standard S-3351, Data Dictionary
- SDLCM Methodology Standard S-3051, System Requirements Specification
- SDLCM Methodology Standard S-3053, System Operations Concept
- SDLCM Methodology Standard S-3171, Logical Design Document
- SDLCM Methodology Standard S-3172, Physical Design Document
- SDLCM Methodology Procedure P-2101, Peer Review

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4. PROCEDURE

4.1 Data Flow Diagram

The data modeling procedure comprises the three major steps identified in the data flow diagram shown in Figure 3101-1.

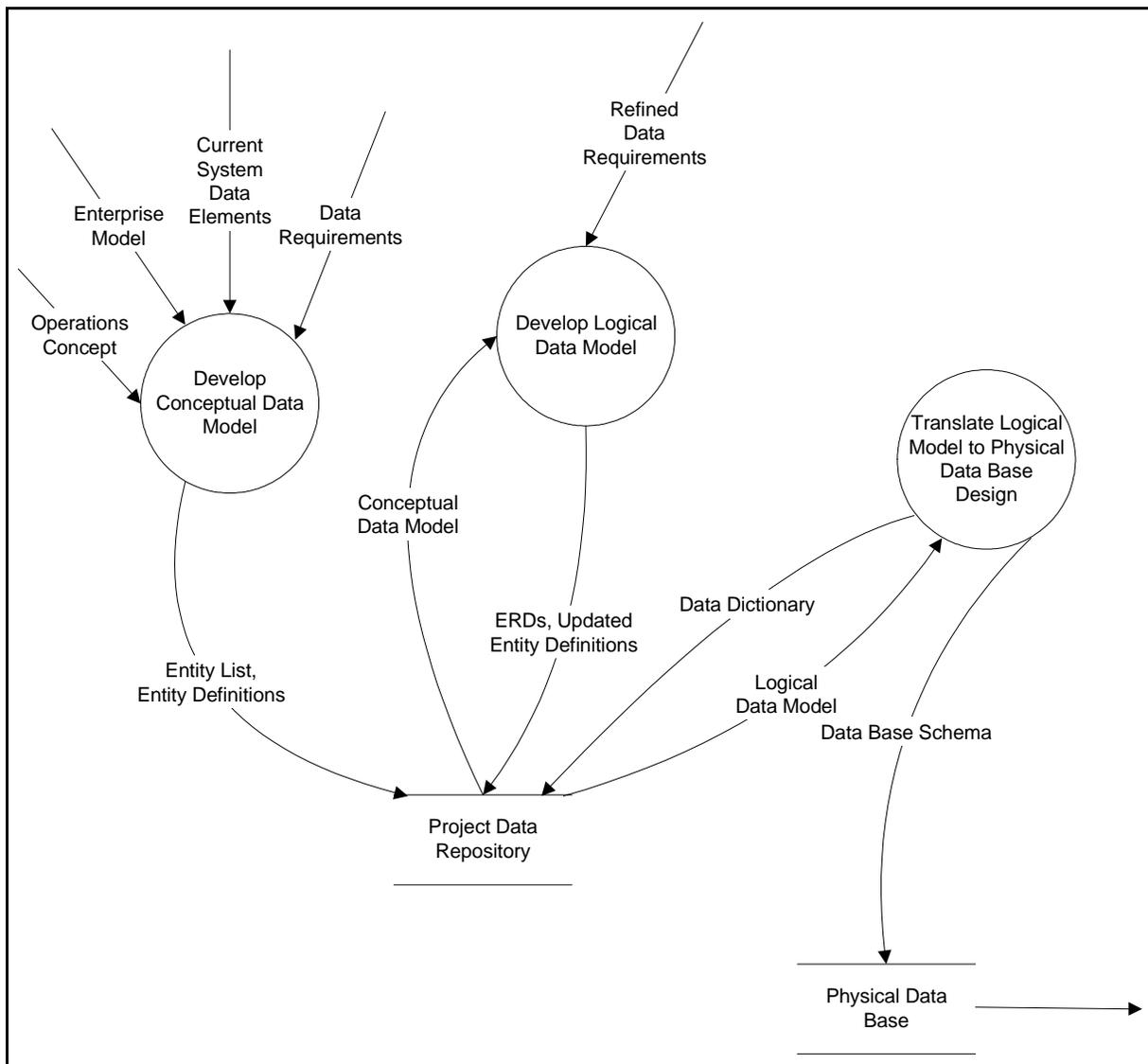


Figure 3101-1. Data Modeling Data Flow Diagram

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4.2 Entry Criteria

Data modeling begins after the draft Project definition is in place. The draft Project definition, current system data elements, data requirements, and information from the Enterprise Model are all inputs to the procedure.

4.3 Steps

Perform the following steps to complete data modeling:

1. Develop Conceptual Data Model
 - Review Project/Maintenance definition, current system data elements, data requirements, and any information contained in the Enterprise Model applicable to the Project. Identify the data entities needed to satisfy the data requirements and possible sources. If the data entities exist in the Enterprise Model, use the same names.
 - Create the data entity list.
 - Define each data entity. Use the guidance found in SDLCM Methodology Standard S-3151, Data Models, in setting up the definitions. Use the Project's approved CASE tool to input the Conceptual Model (the data entity definitions) into the System/Project data repository.
 - Peer review the Conceptual Data Model following SDLCM Methodology Procedure P-2101, Peer Review.
 - After the conceptual data model has been approved, place it under configuration control in the Project's data repository.
 - Include the Data Entity List and Definitions in the System Requirements Specification.
2. Develop the Logical Data Model
 - Review the data requirements documented in the SRS and any additional information developed as a result of Component 2 activities. Retrieve the conceptual data model from the Project's data repository, review, and update if necessary.
 - Determine the attributes of each data entity and add to the entity definitions.
 - Develop the system-level entity relationship diagram (ERD). Include any data exchanged with all external interfaces. Follow the guidance

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contained in SDLCM Methodology Standard S-3152, Entity Relationship Diagrams. Use the Project's approved CASE tool to create the ERD.

- Peer review the system-level ERD following SDLCM Methodology Procedure P-2101, Peer Review.
 - Place the approved system-level ERD under configuration control in the Project's data repository.
 - Decompose the system-level entity ERD to component-level ERDs. Follow the guidance contained in SDLCM Methodology Standard S-3152, Entity Relationship Diagrams. Use the Project's approved CASE tool to create the ERDs.
 - Peer review the component-level ERDs following SDLCM Methodology Procedure P-2101, Peer Review.
 - Place the approved component-level ERDs under configuration control in the Project's data repository.
 - Include the Logical Data Model (ERDs, updated entity definitions) in the Logical Design Document.
3. Translate the Logical data model to the physical data base design.
- Use the Project's CASE tool to convert the data definitions and ERDs to the selected data base management system's data dictionary and schema.
 - Peer review the physical data dictionary and schema following SDLCM Methodology Procedure P-2101, Peer Review.
 - Place the approved data base schema and data dictionary under configuration control in the physical data base under the selected data base management system.
 - Include the schema as the physical data model in the Physical Design Document.

4.4 Exit Criteria

When data modeling is complete, the physical data base design is in place (that is, the physical data base is ready to be populated with actual Project data) and all data needed to support the selected solution to the business problem have been identified and their sources are known. The conceptual data model will have been documented in the SRS, the logical data model in the Logical Design Document, and the physical data model in the Physical Design Document.

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4.5 Verification

Use the peer review procedure to verify the data models at each level (conceptual, logical, and physical).

4.6 Roles

Table 3101-1 is a Step-Role Table for the data modeling procedure:

Table 3101-1. Step-Role Table for Data Modeling (1 of 2)

Steps:	Roles:	Overall PM	Tech PM	Data Base Engineer	Software Designer	QA	CM
1. Develop Conceptual Data Model							
Review data-related information and identify data entities that satisfy data requirements.			S	P	S		
Create Data Entity List.			R	P			
Define each data entity.			R				
Peer Review data entity list and definitions.				S, P	P	R	
Put conceptual data model under configuration control.				S		R	P
Include conceptual data model in SRS.		A		P		R	
2. Develop Logical Data Model							
Review data requirements and conceptual data model.			S	P	S		
Determine data attributes and add to definitions.				P	S		
Develop system-level ERD.				P	S		
Peer Review system-level ERD				P, S	S	R	
Put system-level ERD under configuration control.				P		R	P
Develop component-level ERDs				P	S		

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Steps:	Roles:	Overall PM	Tech PM	Data Base Engineer	Software Designer	QA	CM
Peer Review component-level ERDs				P, S	S	R	
Put component-level ERDs under configuration control.				P		R	P
Include logical data model in Logical Design Document.			A	P		R	
3. Translate Logical Data Model into Physical Data Base Design.							
Use Project's CASE tool to create the data dictionary and data base schema.			S	P	S		
Peer Review physical data model				S, P	S	R	
Put physical data model under configuration control.				S		R	P
Include physical data model in Physical Design Document.			A	P		R	

Legend: P = Performs, R = Reviews, A = Approves, S = Supports