

OV-7 : Logical Data Model

This document defines the mapping between the DODAF OV-7 Logical Data Model and the ISO 10303 AP233 Systems Engineering information model. This mapping is defined for the purpose of enabling data exchange between computer applications supporting the ISO AP233 standard and those supporting the US DoDAF CADM format, specifically CADM 1.02.

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1. Introduction

The OV-7 Logical Data Model Product Description in the DoDAF Volume II: Product Descriptions document defines OV-7 as follows.

The Logical Data Model describes the structure of an architecture domain's system data types and the structural business process rules (defined in the architecture's Operational View) that govern the system data. It provides a definition of architecture domain data types, their attributes or characteristics, and their interrelationships.

DoDAF Volume II also describes the use of various types of diagrams for representing OV-7 content.

2. OV-7 Concepts

A Logical Data Model may be used to represent the following concepts.

entity

a concept of interest

attribute

a characteristic of a concept of interest

relationship

a link between concepts of interest

attribute domain

the possible values for a characteristic of a concept of interest

3. OV-7 AP233 Mapping Issues

Warning:

At the time this document was written, AP233 was still undergoing development.

This section describes the issues in mapping between OV-7 Logical Data Model and ISO AP233 as of the date of publication of this document. These issues may be addressed in future work by the DoDAF Working Group, the ISO AP233 development team or others.

1. AP233 is not an Entity-Relationship modeling language, and therefore E-R modeling is not directly supported. A file constituting an E-R model in a particular language can be managed using AP233. Alternatively, by treating each Entity as an AP233 Product, Attribute as an AP233 Independent_property and Relationship as an AP233 Product_definition_relationship (with the associated overhead) E-R concepts can be

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represented and version controlled at the Entity level. This mapping takes the simpler attached-file approach.

4. Mapping OV-7 CADM XML to AP233 XML

This section defines the mapping from the CADM XML representation of OV-7 Logical Data Model into an ISO AP233 XML representation of that same data. The mapping is defined at the detailed level of the XML elements and attributes themselves as it is aimed at implementors. See AP233 for more information on the AP233 XML Schema and the AP233 EXPRESS schema.

Please review the rules for AP233 XML data production as they are applicable to all implementations.

4.1. OV-7 Logical Data Model Mapping

This section describes the mapping for the CADM OV-7 Logical Data Model itself. Because AP233 is not an E-R modeling language, a convenient representation of all of the CADM OV-7 requirements is not available. By treating each E-R Entity as an AP233 Product, with related version and definition, it is possible to fit the OV-7 detailed E-R concepts into AP233. However, as there are suitable E-R notations available the current mapping assumes their usage for most of the OV-7 requirements.

The following OV-7 E-R concepts are not directly supported by the current mapping:

- DATA-ATTRIBUTE. AP233 `Independent_property` assigned to an AP233 `Class` could support some of this requirement.
- DATA-DOMAIN. AP233 `Independent_property` has a `property_type` that could support some of this requirement.
- DATA-ENTITY-RELATIONSHIP
- CATEGORY-RELATIONSHIP
- DATA-DOMAIN-LIST
- DATA-DOMAIN-LIST-VALUE

The following table documents the CADM LOGICAL-DATA-MODEL(LOG_DATA_MDL) mapping.

CADM XML Element(s)	AP233 XML Element(s) or Attributes(s)
LOG_DATA_MDL	An AP233 Document with related version and definition, as specified in the AP233 approach to documents each classified as an LOGICAL-DATA-MODEL . See the mapping for CADM Document for more detail.

LOG_DATA_MDL / LDM_DOC_ID	The identifier for the Document representing the CADM Logical Data Model assigned by the owning organization.
LOG_DATA_MDL / CONC_DAT_MDL_IA_ID	An AP233 Document_definition_relationship where the AP233 representation of the CADM Logical Data Model is referenced by the Relating_document_definition and the AP233 representation of the CADM Conceptual Data Model is referenced by the Related_document_definition. The AP233 Document_definition_relationship is classified as LOGICAL-DATA-MODEL-CONCEPTUAL-DATA-MODEL .
LOG_DATA_MDL / DAT_DICT_SP_DOC_ID	An AP233 Document_definition_relationship where the AP233 representation of the CADM Logical Data Model is referenced by the Relating_document_definition and the AP233 representation of the CADM Data Dictionary Specification is referenced by the Related_document_definition. The AP233 Document_definition_relationship is classified as LOGICAL-DATA-MODEL-DATA-DICTIONARY-SPECIFICATION .

Table 1: Within the LOG_DATA_MDL_TBL CADM XML Element

4.2. Conceptual Data Model Mapping

The following table documents the CADM CONCEPTUAL-DATA-MODEL (CONC_DATA_MODEL) Element mapping

CADM XML Element(s)	AP233 XML Element(s) or Attributes(s)
CONC_DATA_MODEL	An AP233 Document with related version and definition, as specified in the AP233 approach to documents each classified as an CONCEPTUAL-DATA-MODEL . The data model itself may be contained in an AP233 File in which case an AP233 Digital_document_definition is used. See the mapping for CADM Document for more detail.

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CONC_DATA_MODEL / CON_DAT_MDL_IA_ID	The identifier for the Document representing the CADM Logical Data Model assigned by the owning organization.
CONC_DATA_MODEL / CON_DAT_MDL_CRE_ID	An AP233 Organization_or_person_in_organization_assignment linking the AP233 representation of the creator, AP233 Person or Organization, and the AP233 Document representing the CADM Conceptual Data Model.
CONC_DATA_MODEL / CON_DAT_MDL_DEV_NM	A classification of the AP233 element representing the CADM Conceptual Data Model with a relevant Model-Development-Methodology -concatenated with the name of the methodology.
CONC_DATA_MODEL / CON_DAT_MDL_DEV_ID	A classification of the AP233 element representing the CADM Conceptual Data Model with a relevant Model-Development-Status -concatenated with the name of the status.
CONC_DATA_MODEL / CON_DAT_MDL_DVT_NM	A classification of the AP233 element representing the CADM Conceptual Data Model with a relevant Model-Development-Tool -concatenated with the name of the tool.
CONC_DATA_MODEL / CON_DAT_MDL_NOT_NM	A classification of the AP233 element representing the CADM Conceptual Data Model with a relevant the name of the notation. For example, OMG-UML-1.5-Class-Diagram . If an AP233 File contains the data model, it and the Digital_document_definition are classified.
CONC_DATA_MODEL / CON_DAT_MDL_PUR_TX	An AP233 Description_text_assignment and Description_text as described in AP233 Descriptions classified as a PurposeText . The AP233 description is assigned to the Document representing the model.
CONC_DATA_MODEL / CON_DAT_MDL_RFN_CD	A classification of the AP233 element representing the CADM Conceptual Data Model as ENTITY RELATIONSHIP, FULLY ATTRIBUTED or KEY BASED .
CONC_DATA_MODEL /	An AP233 Date_or_date_time_assignment

CON_DAT_MDL_RVS_DT	element (as specified in AP233 Dates) with a child <i>Items</i> element that refers to the AP233 representation of the CADM Conceptual Data Model. The <i>Date_or_date_time_assignment</i> is classified as a Revision effective calendar date .
CONC_DATA_MODEL / CON_DAT_MDL_SCP_TX	n AP233 <i>Description_text_assignment</i> and <i>Description_text</i> as described in AP233 Descriptions classified as a ScopeText . The AP233 description is assigned to the Document representing the model.
CONC_DATA_MODEL / CON_DAT_MDL_STA_DT	An AP233 <i>Date_or_date_time_assignment</i> element (as specified in AP233 Dates) with a child <i>Items</i> element that refers to the AP233 representation of the CADM Conceptual Data Model. The <i>Date_or_date_time_assignment</i> is classified as a Status Effective Calendar Date .
CONC_DATA_MODEL / CON_DAT_MDL_TNS_CD	A = AS IS MODEL; T = TO BE MODEL
CONC_DATA_MODEL / CON_DAT_MDL_TNS_DT	An AP233 <i>Date_or_date_time_assignment</i> element (as specified in AP233 Dates) with a child <i>Items</i> element that refers to the AP233 representation of the CADM Conceptual Data Model. The <i>Date_or_date_time_assignment</i> is classified as a Tense Effective Date .

Table 1: Within the CONC_DATA_MODEL_TBL CADM XML Element

4.3. DATA-ENTITY Mapping

The following table documents the CADM DATA-ENTITY (DATA_ENT) Element mapping

CADM XML Element(s)	AP233 XML Element(s) or Attributes(s)
DATA_ENT	An AP233 <i>Class</i> with an AP233 <i>Document_assignment</i> assigning the <i>Class</i> to the AP233 <i>Document_definition</i> representing the CADM Conceptual Data Model.
DATA_ENT / DAT_ENT_IA_ID	The identifier for the AP233 <i>Class</i> representing the CADM Data Entity assigned by the owning

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	organization
DATA_ENT / DAT_ENT_CAT_CD	An AP233 classification of the AP233 representation of the CADM Data Entity as either ACTIVE DATA ENTITY or INACTIVE DATA ENTITY .
DATA_ENT / DAT_ENT_DEPEND_CD	An AP233 classification of the AP233 representation of the CADM Data Entity based on the following value. <ul style="list-style-type: none"> • when = 1, as INDEPENDENT ENTITY • when = 2, as DEPENDENT ENTITY • when = 8, as ENTITY DEPENDENCY NOT SPECIFIED • when = 9, as ENTITY DEPENDENCY NOT KNOWN .
DATA_ENT / DAT_ENT_RVS_DT	An AP233 Date_or_date_time_assignment element (as specified in AP233 Dates) with a child Items element that refers to the AP233 representation of the CADM Data Entity. The Date_or_date_time_assignment is classified as a Revision Date . .
DATA_ENT / DAT_ENT_SCP_TX	An AP233 Description_text_assignment and Description_text as described in AP233 Descriptions classified as a ScopeText . The AP233 description is assigned to the AP233 representation of the CADM Data Entity.
DATA_ENT / DAT_ENT_XML_LTG_NM, DAT_ENT_XML_RLT_NM, DAT_ENT_XML_RST_NM, DAT_ENT_XML_STG_NM	An AP233 identifier assigned to the AP233 representation of the CADM Data Entity classified as a XML LONG TAG NAME, XML RECORD DELIMITER LONG TAG NAME, XML RECORD DELIMITER SHORT TAG NAME, or XML SHORT TAG NAME . .

Table 1: Within the DATA_ENT_TBL CADM XML Element

5. Example OV-7 CADM XML Data

This section contains example OV-7 CADM XML data.

5.1. Example LOG_DATA_MDL

```
<LOG_DATA_MDL>
  <LDM_DOC_ID>33770001</LDM_DOC_ID>
```

```

</LOG_DATA_MDL>
<DOC>
  <DOC_ID>33300021</DOC_ID>
  <DOC_NM>SAMPLE LOGICAL DATA MODEL {OV-7}</DOC_NM>
  <CSC_ID>20000001</CSC_ID>
  <TIME_FRAME_PRD_ID>20102341</TIME_FRAME_PRD_ID>
  <DOC_APP_CALDT>20031126</DOC_APP_CALDT>
  <DOC_ARCHPROD_TY_CD>08</DOC_ARCHPROD_TY_CD>
  <DOC_CRTN_CALDT>20031203</DOC_CRTN_CALDT>
  <DOC_CAT_CD>J</DOC_CAT_CD>
  <DOC_VER_ID>VERSION 1.0</DOC_VER_ID>
</DOC>

```

6. Example OV-7 AP233 XML Data

This section contains example OV-7 AP233 XML data.

6.1. Example Document

```

<ap233:Document id="id-doc12771" />
<ap233:Identification_assignment id="id-doc12771-idassign">
  <Identifier>33770001</Identifier>
  <Items>
    <ap233:Document ref="id-doc12771" xsi:nil="true" />
  </Items>
</ap233:Identification_assignment>
<ap233:Classification_assignment
id="id-doc12771-idassign-classification_assignment">
  <Items>
    <ap233:Identification_assignment ref="id-doc12771-idassign"
xsi:nil="true" />
  </Items>
  <Assigned_class>
    <ap233:External_class ref="id-Document_identification_code"
xsi:nil="true" />
  </Assigned_class>
</ap233:Classification_assignment>
<ap233:Document_version id="id-docver12771">
  <Of_product>
    <ap233:Document ref="id-doc12771" xsi:nil="true" />
  </Of_product>
</ap233:Document_version>
<ap233:Document_definition id="id-docdef12771">
  <Defined_version>
    <ap233:Document_version ref="id-docver12771" xsi:nil="true" />
  </Defined_version>
  <Initial_context>
    <ap233:View_definition_context ref="id-ov7" xsi:nil="true" />
  </Initial_context>

```

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```
</ap233:Document_definition>
<ap233:Classification_assignment
id="id-docall12771-classification_assignment">
  <Items>
    <ap233:Document ref="id-doc12771" xsi:nil="true" />
    <ap233:Document_version ref="id-docver12771" xsi:nil="true" />
    <ap233:Document_definition ref="id-docdef12771" xsi:nil="true" />
  </Items>
  <Assigned_class>
    <ap233:External_class ref="id-LOGICAL-DATA-MODEL" xsi:nil="true" />
  </Assigned_class>
</ap233:Classification_assignment>
```

6.2. Example Document_definition_relationship

```
<ap233:Document_definition_relationship>
  <Relating_document_definition>
    <ap233:Document_definition ref="id-docdef445566" xsi:nil="true" />
  </Relating_document_definition>
  <Related_document_definition>
    <ap233:Document_definition ref="id-docdef12771" xsi:nil="true" />
  </Related_document_definition>
</ap233:Document_definition_relationship>

<ap233:Document id="id-doc445566" />

<ap233:Identification_assignment id="id-doc445566-idassign">
  <Identifier>55770001</Identifier>
  <Items>
    <ap233:Document ref="id-doc445566" xsi:nil="true" />
  </Items>
</ap233:Identification_assignment>

<ap233:Classification_assignment
id="id-doc445566-idassign-classification_assignment">
  <Items>
    <ap233:Identification_assignment ref="id-doc445566-idassign"
xsi:nil="true" />
  </Items>
  <Assigned_class>
    <ap233:External_class ref="id-Document_identification_code"
xsi:nil="true" />
  </Assigned_class>
</ap233:Classification_assignment>

<ap233:Document_version id="id-docver445566">
  <Of_product>
    <ap233:Document ref="id-doc445566" xsi:nil="true" />
  </Of_product>
</ap233:Document_version>

<ap233:Document_definition id="id-docdef445566">
  <Defined_version>
```

```

    <ap233:Document_version ref="id-docver445566" xsi:nil="true" />
  </Defined_version>
  <Initial_context>
    <ap233:View_definition_context ref="id-ov7" xsi:nil="true" />
  </Initial_context>
</ap233:Document_definition>

<ap233:Classification_assignment
id="id-docall445566-classification_assignment">
  <Items>
    <ap233:Document ref="id-doc445566" xsi:nil="true" />
    <ap233:Document_version ref="id-docver445566" xsi:nil="true" />
    <ap233:Document_definition ref="id-docdef445566" xsi:nil="true" />
  </Items>
  <Assigned_class>
    <ap233:External_class ref="id-CONCEPTUAL-DATA-MODEL" xsi:nil="true" />
  </Assigned_class>
</ap233:Classification_assignment>

```

6.3. Example Class

```

<ap233:Class id="id-class1">
</ap233:Class>

<ap233:Identification_assignment id="id-class1-idassign">
  <Identifier>Trajectory</Identifier>
  <Items>
    <ap233:Class ref="id-class1" xsi:nil="true" />
  </Items>
</ap233:Identification_assignment>

<ap233:Document_assignment id="id-docassnnclass1">
  <Assigned_document>
    <ap233:Document_definition ref="id-docdef445566" xsi:nil="true" />
  </Assigned_document>
  <Is_assigned_to>
    <ap233:Class ref="id-class1" xsi:nil="true" />
  </Is_assigned_to>
</ap233:Document_assignment>

<ap233:Classification_assignment id="id-class1-classification_assignment">
  <Items>
    <ap233:Class ref="id-class1" xsi:nil="true" />
  </Items>
  <Assigned_class>
    <ap233:External_class ref="id-INDEPENDENT-ENTITY" xsi:nil="true" />
  </Assigned_class>
</ap233:Classification_assignment>

```