

GeoModel Data Model

Reference Manual

Version 1.1

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1.1	Apr 30, 2001	Upgrade for GFDK 4.0

Trademarks:

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Introduction

This document contains a description of the GeoModel data model, all CAL supported DataEntities in the GeoModel Data Model and all tables supported by DBGEN,.

1.1 Intended Audience

This reference guide is primarily intended for applications programmers. It is assumed that readers of this document are familiar with the contents in the related documentation described below.

1.2 Related Documentation

The GeoModel Seismic DataModel Description gives a description of the basic datamodel concepts, the Representation Submodel and the Seismic Activity Submodel of GeoModel.

The SEISMOS Data Model Description describes those entities of the GeoModel Data Model that are used by SEISMOS.

The Common Access Layer (CAL) is presented in CAL Users Guide, and a complete reference of CAL Access Routines can be found in CAL Users Reference.

The cal_browser, an interactive database browser for CAL supported DataEntities, provides on-line documentation of a DataEntity in the same style as in this document¹.

1.3 About This Document

This document contains a general description of the GeoModel data model, a description of the CAL data entities and a description of the dbgen accessible part of the data model.

1. In fact, the documentation of each DataEntity in this document is generated with cal_schema, the documentation module of cal_browser.

Data Model Overview

This document contains the complete conceptual model of GeoModel 4.0. The conceptual model defines all entities and relationships in the data model.

2.1 About This Document

The GeoModel data model is divided into submodels. This document presents the conceptual model for each submodel in one Chapter per submodel. Some submodels are too large (too many entities/relationships) to fit into one page. These submodels are presented in several diagrams that partly overlap. (e.g. the sections “data_set Data Model”, “Trace Group List Data Model” and “data_file_set Data Model” define a data_set representation in the Seismic Data Model.)

2.2 Related Documentation

The following documents provide further details on the GeoModel 4.0 Data Model:

1. GeoModel 4.0 CAL-Supported DataEntities Reference Guide

Description: Attribute definitions (name, valuetype, measurement, description) for all GeoModel entities supported by CAL (Common Access Layer)

SMS Source Document: stavsms::cs_documents/geomodel_ref_40.fm

2. GeoModel 4.0 Database schema

Description: Oracle table definitions for all GeoModel database tables.

SMS Source Document: stavsms::dbgen_sql/*.sqlp

Each diagram in this document has a footnote with information about where further details about the data model may be found.

Cartography Data Model

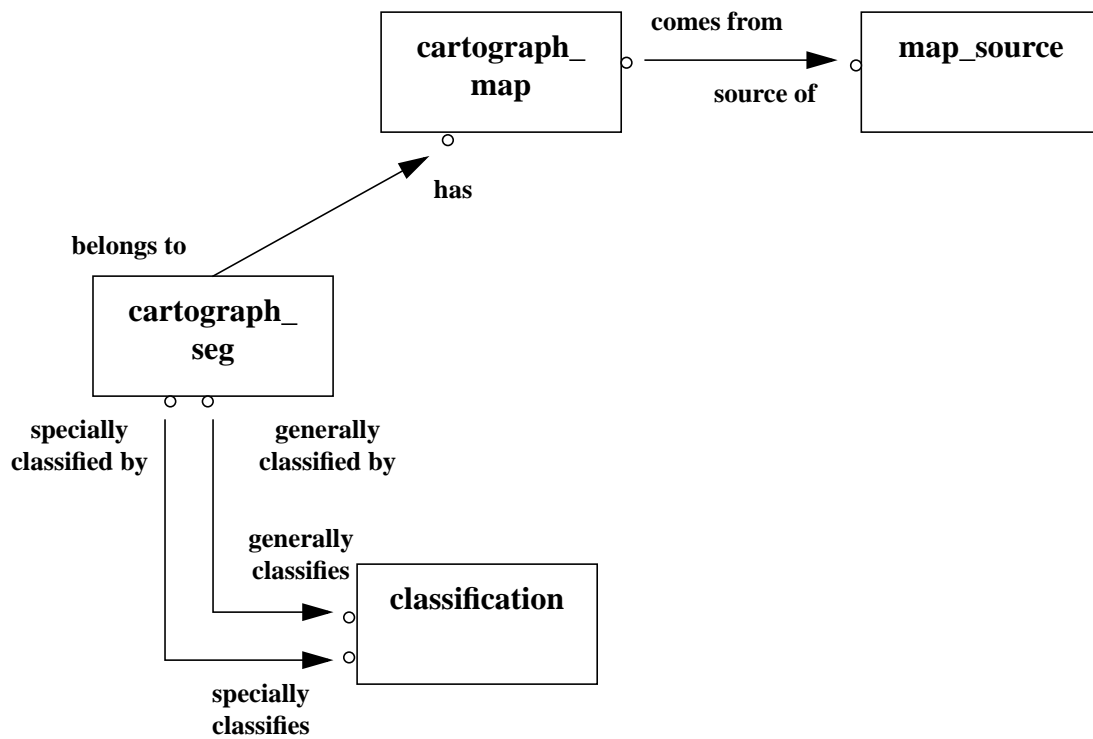


Figure 1: GeoModel 4.0 Cartography Data Model¹

1. Tables are defined in dbgen_sql/gmg_cartography.sqlp

Geometry Data Model

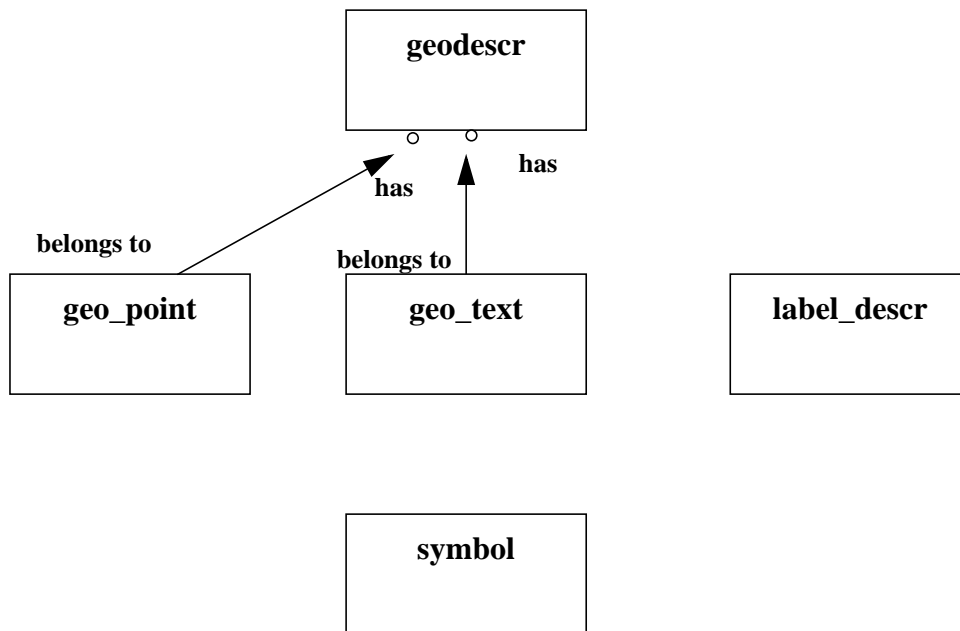
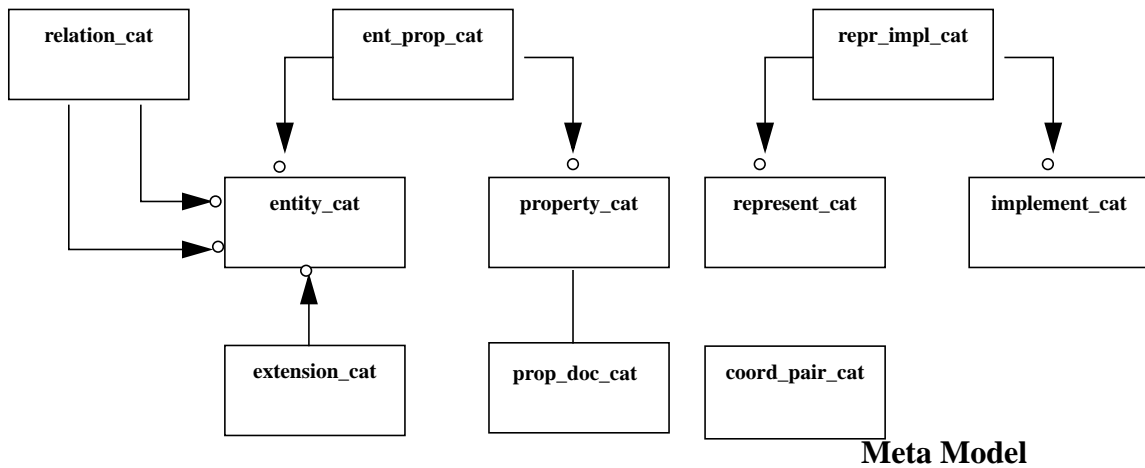


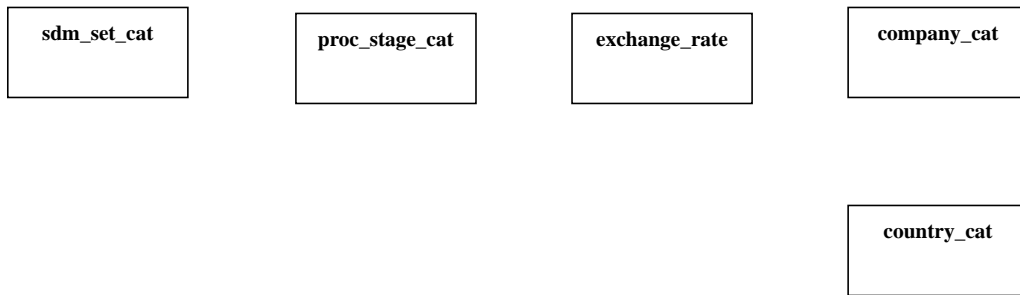
Figure 2: GeoModel 4.0 Geometry Data Model¹

1. The tables are defined in dbgen_sql/gmg_geometry.sqlp

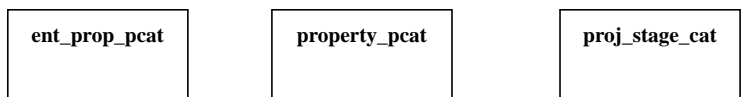
Meta Model & Catalogs Data Model



Meta Model



Global Catalogs



Project Catalogs

Figure 3: GeoModel 3.8 Meta Model and Catalogs Data Model¹

1. The tables are defined in dbgen_sql/gmg_metadb.sqlp

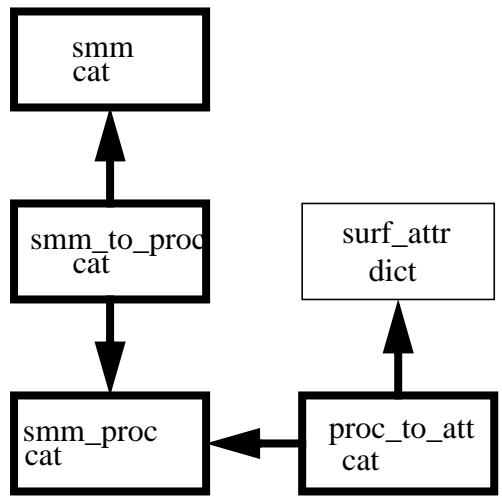


Figure 4: Surface Macro Model Catalogs¹

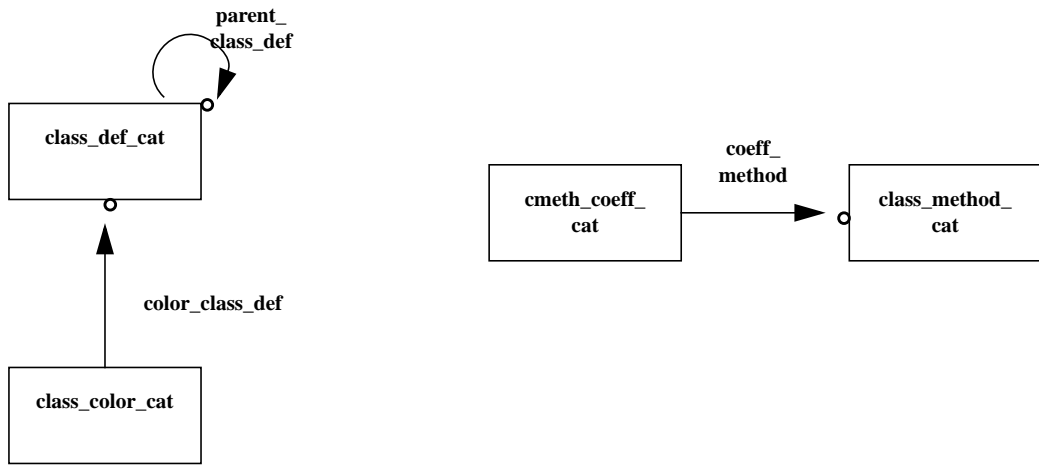


Figure 5: Seisclass Catalogs²

1. The tables are defined in dbgen_sql/gmg_metadb.sqlp
 2. The tables are defined in dbgen_sql/gmg_seisclass.sqlp

Position Data Model

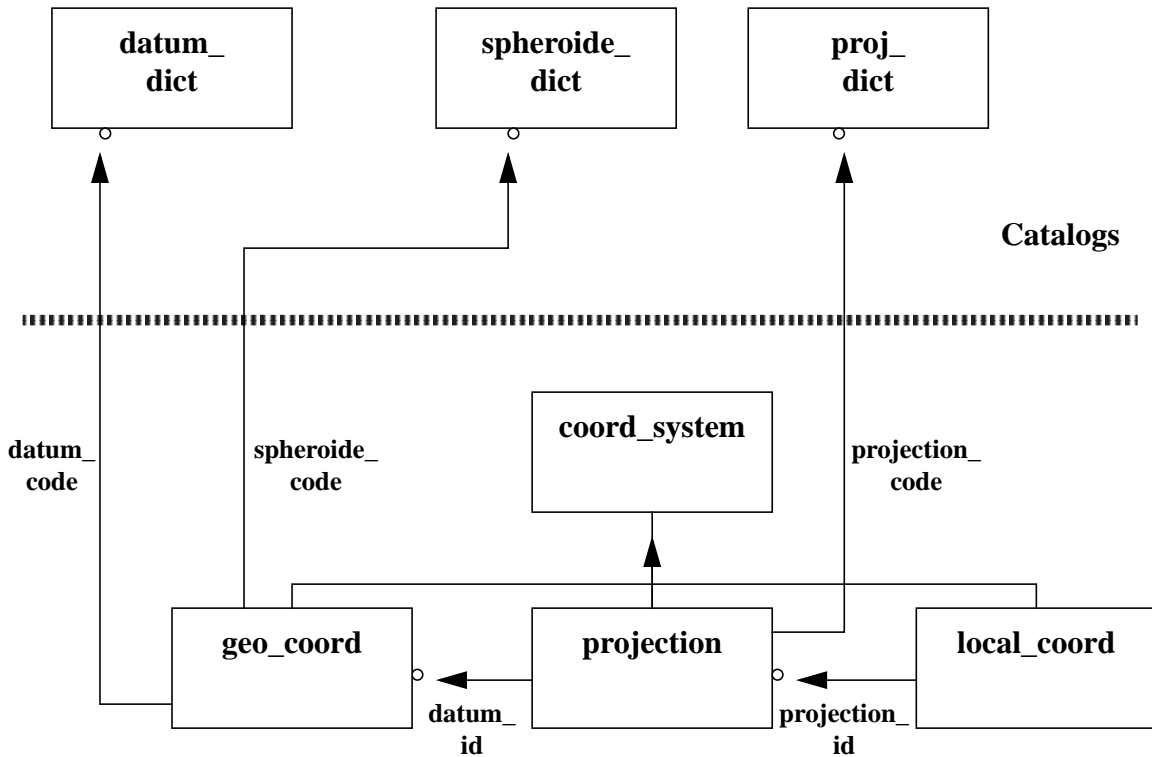


Figure 6: GeoModel 4.0 Position Data Model - Coordinate System¹

1. The catalog tables are defined in dbgen_sql/gmg_coordinate.sqlp. cs_documents/
geomodel_ref_40.fm contains attribute definitions for the coord_system dataentities

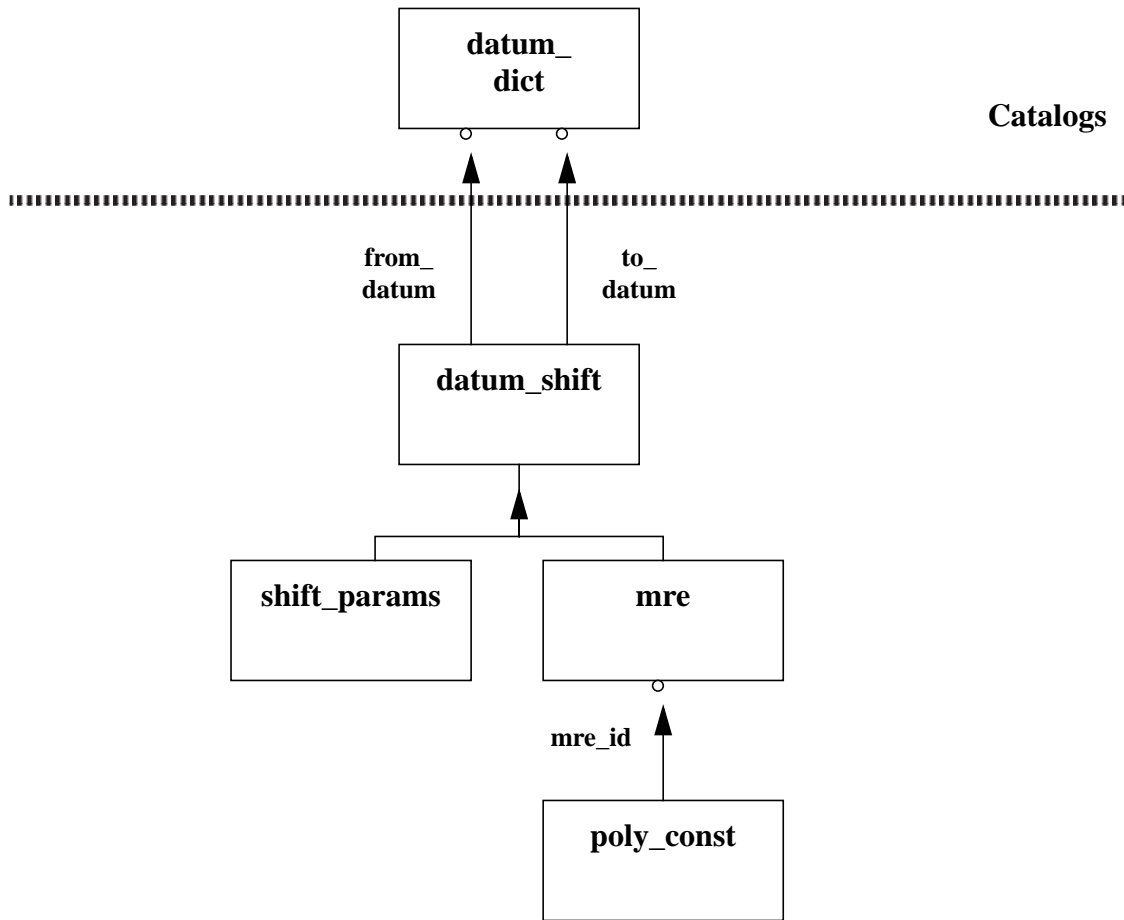


Figure 7: GeoModel 4.0 Position Data Model - Datum Shift¹

1. The datum_dict catalog table is defined in dbgen_sql/gmg_coordinate.sqlp. cs_documents/geomodel_ref_40.fm contains attribute definitions for the dataentities

Process Data Model

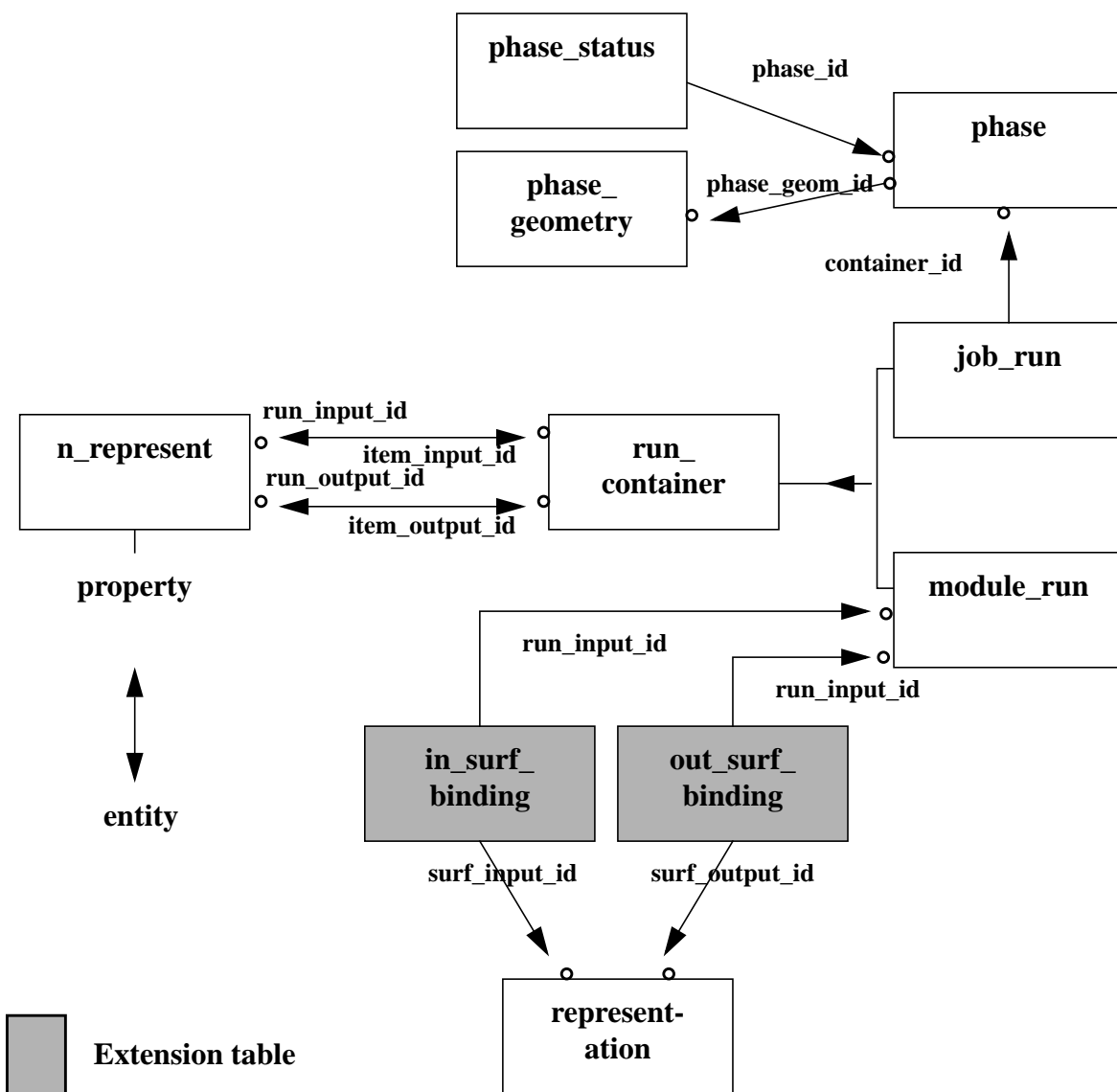


Figure 8: GeoModel 4.0 Process Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

Project Data Model

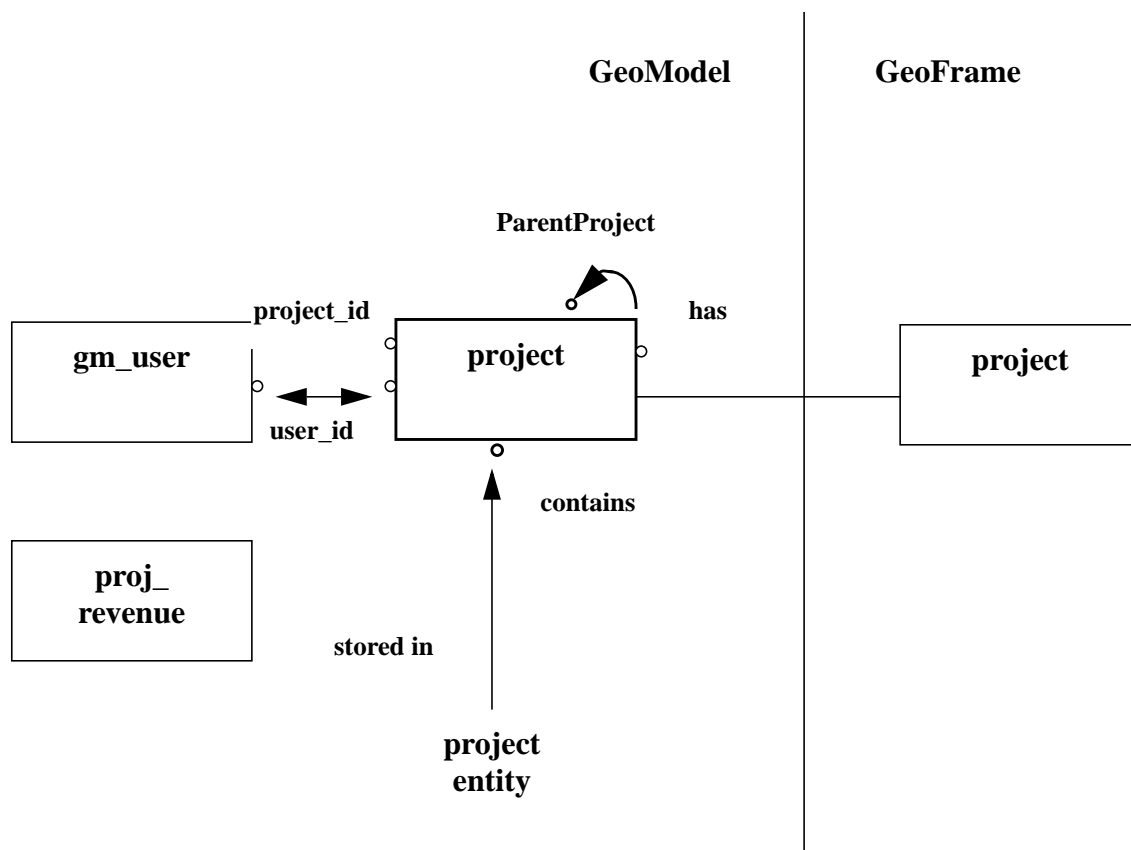


Figure 9: GeoModel 4.0 Project Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

Regions Data Model

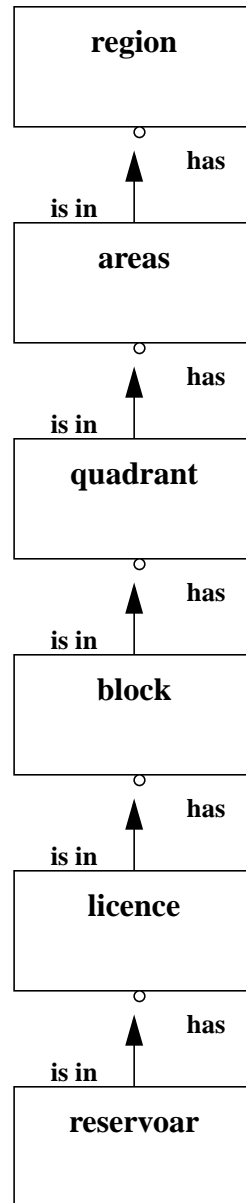


Figure 10: GeoModel 4.0 Regions Data Model¹

1. The tables are defined in `dbgen_sql/gmg_regions.sql`

Set Data Model

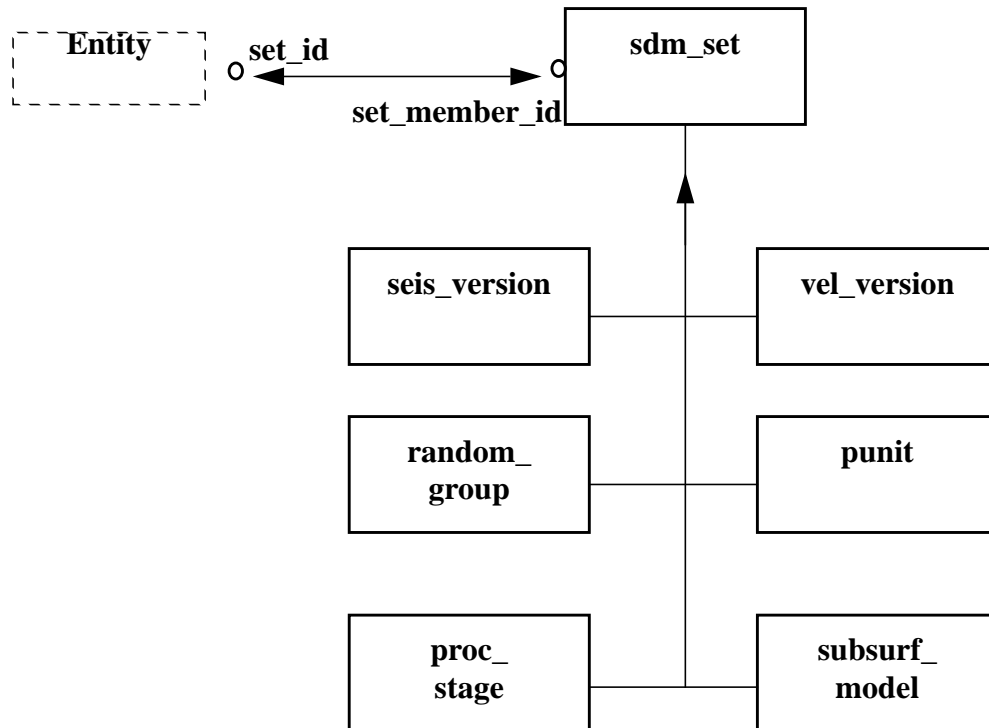


Figure 11: GeoModel 4.0 sdm_set Subtypes¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

10.1 Seismic Version Data Model

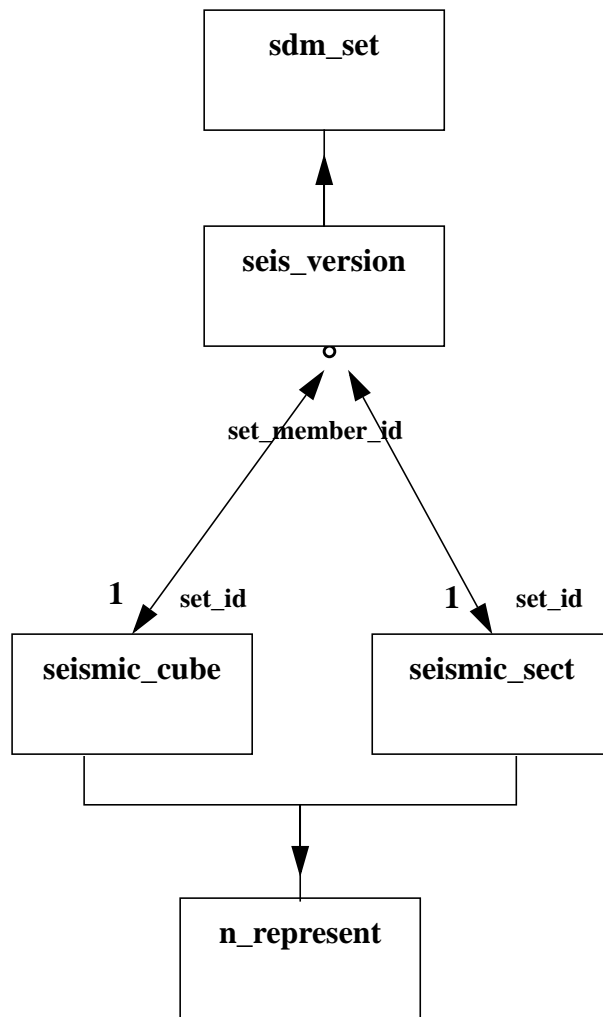


Figure 12: GeoModel 4.0 Seismic Version Data Model¹

1. The entity descriptions are given in `cs_documents/geomodel_ref_40.fm`

10.2 Velocity Version Data Model

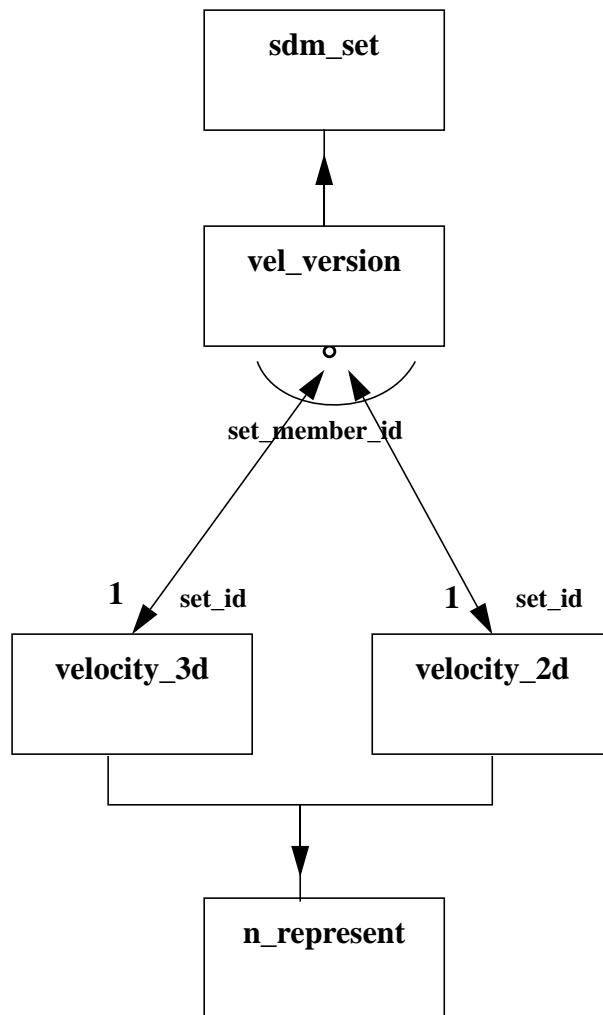


Figure 13: GeoModel 4.0 Velocity Version Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

10.3 Random Group Data Model

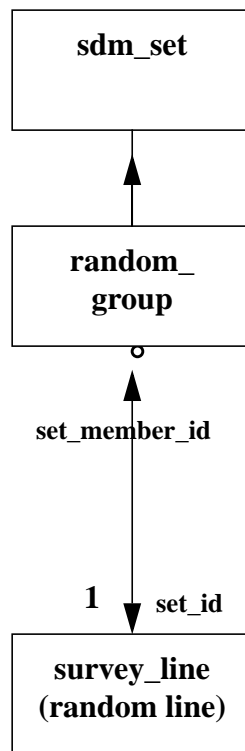


Figure 14: GeoModel 4.0 Random Group Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

10.4 Processing Unit Data Model

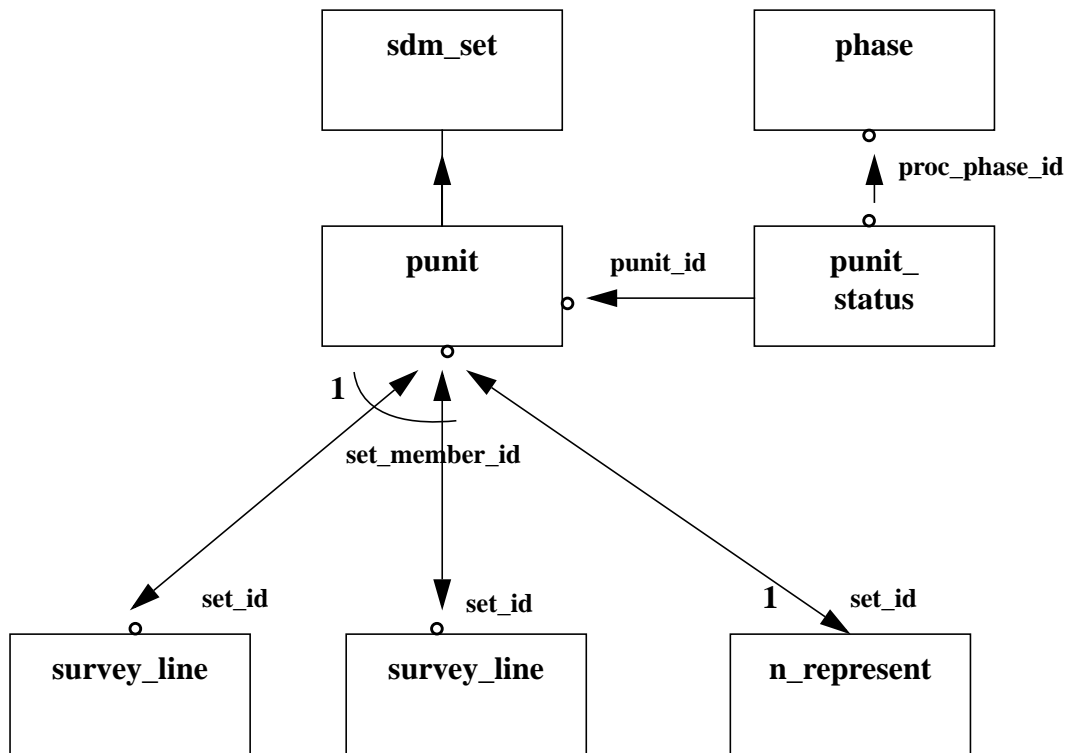


Figure 15: GeoModel 4.0 Processing Unit Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

10.5 Processing Stage Data Model

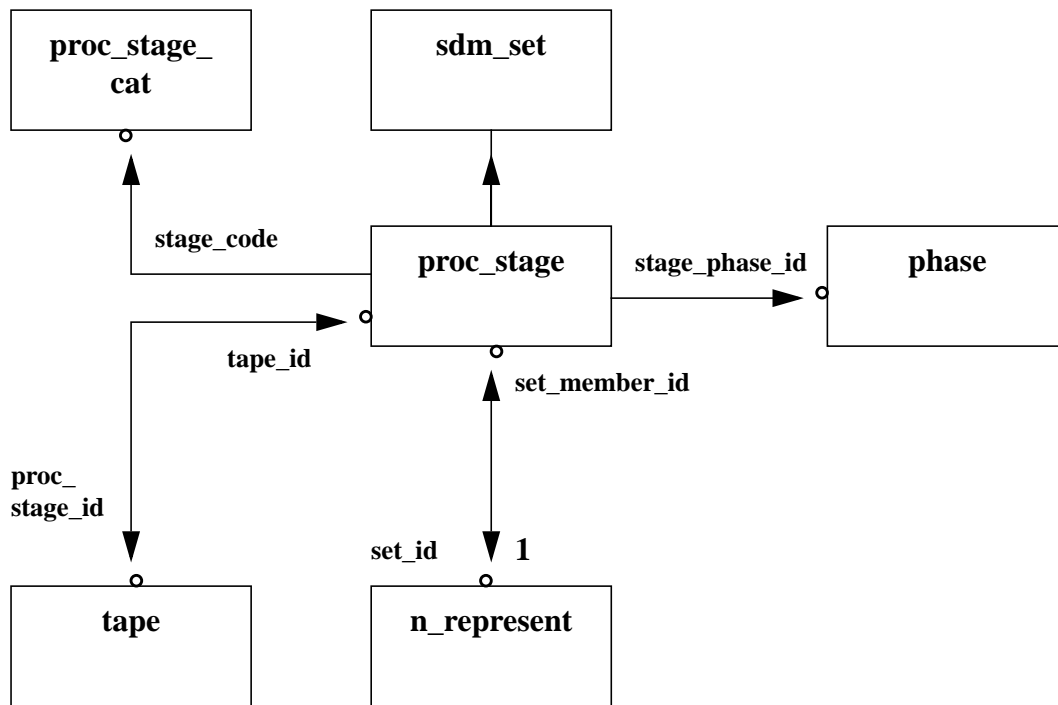


Figure 16: GeoModel 4.0 Processing Stage Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

10.6 Kudoss Subsurface Model Data Model

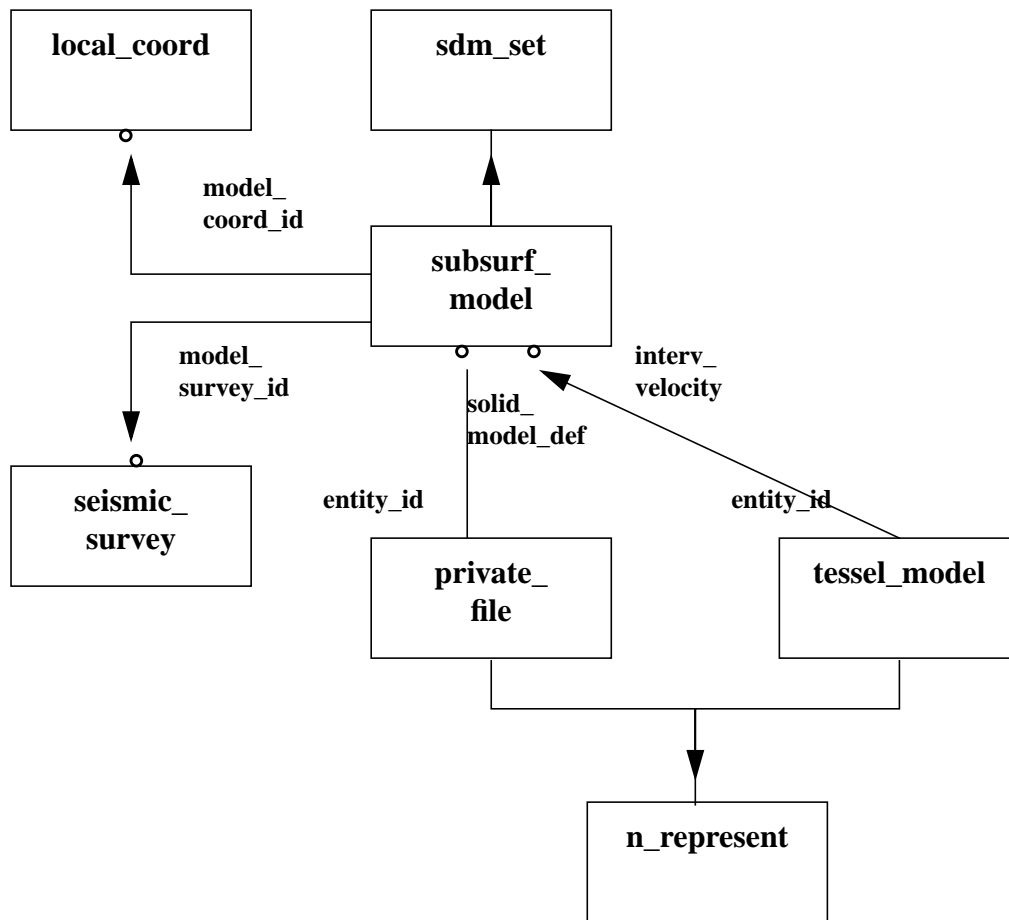


Figure 17: GeoModel 4.0 Kudoss Subsurface Model Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

SeisClass Data Model

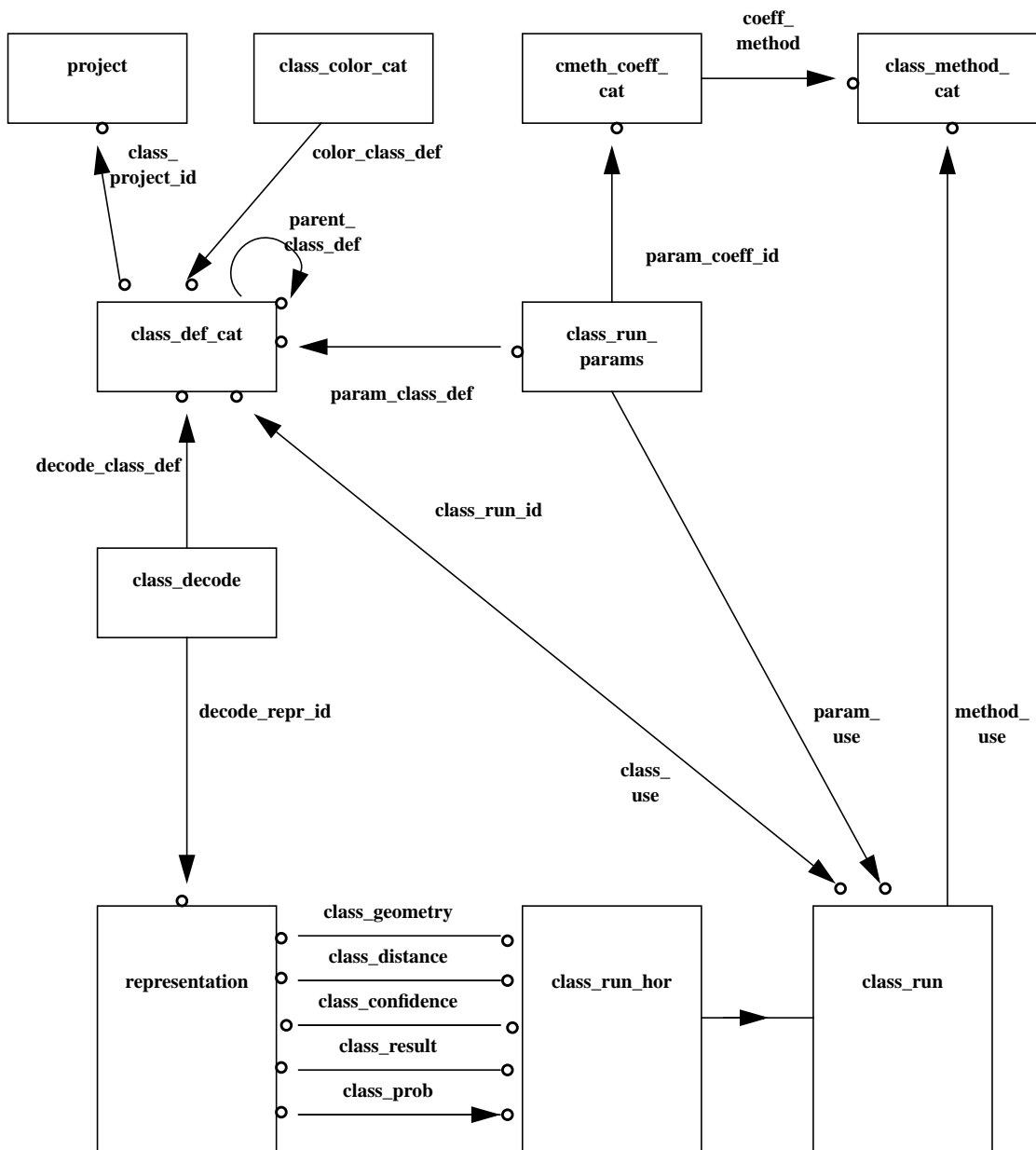


Figure 18: SeisClass Horizontal Classification Data Model

All classes supported by SeisClass are defined in the **class_def_cat** catalog. Classes are organized in a class hierarchy through the *parent_class_def* relationship. A class may user-defined, in which case it may optionally be defined only within a given **project**. Both global and project-specific classes may have a class color usage defined by **class_color_cat**. The *color_class_def* relationship is OneToOne per project, i.e. only one color usage is allowed per class per project.

Different classification methods are defined in the **class_method_cat** catalog. Some methods define a set of parameters or coefficients using the **cmeth_coeff_cat** catalog.

The **class_run** entity defines the execution of a classification run. A classification run has relationships defining which classification method is used (*method_use*) and optionally which classes are used (*class_use*). In cases where method parameter defaults are overridden, actual parameter values for a class run are stored in the **class_run_params** entity (*param_use* relationship). A non-default parameter value may optionally apply for a given class, as defined in the *param_class_def* relationship.

A horizontal classification run is defined as a subtype of class_run, **class_run_hor**. This entity inherits all attributes of class_run and has a number of relationships to some surface **representations** in addition. These relationships include surface representations that define the model geometry, the class probability representations, the confidence and distance representations and the classification result representation. All related representations must be of the same subtype (e.g. grid) for a given class_run_hor.

Representations containing class definitions has an associated translation table, **class_decode**, which defines the translation from bulk data values to class definitions. Though conceptually a OneToMany extension table of representation, class_decode is implemented as a full-blown entity for data access reasons (no CAL support on surface representation entities).

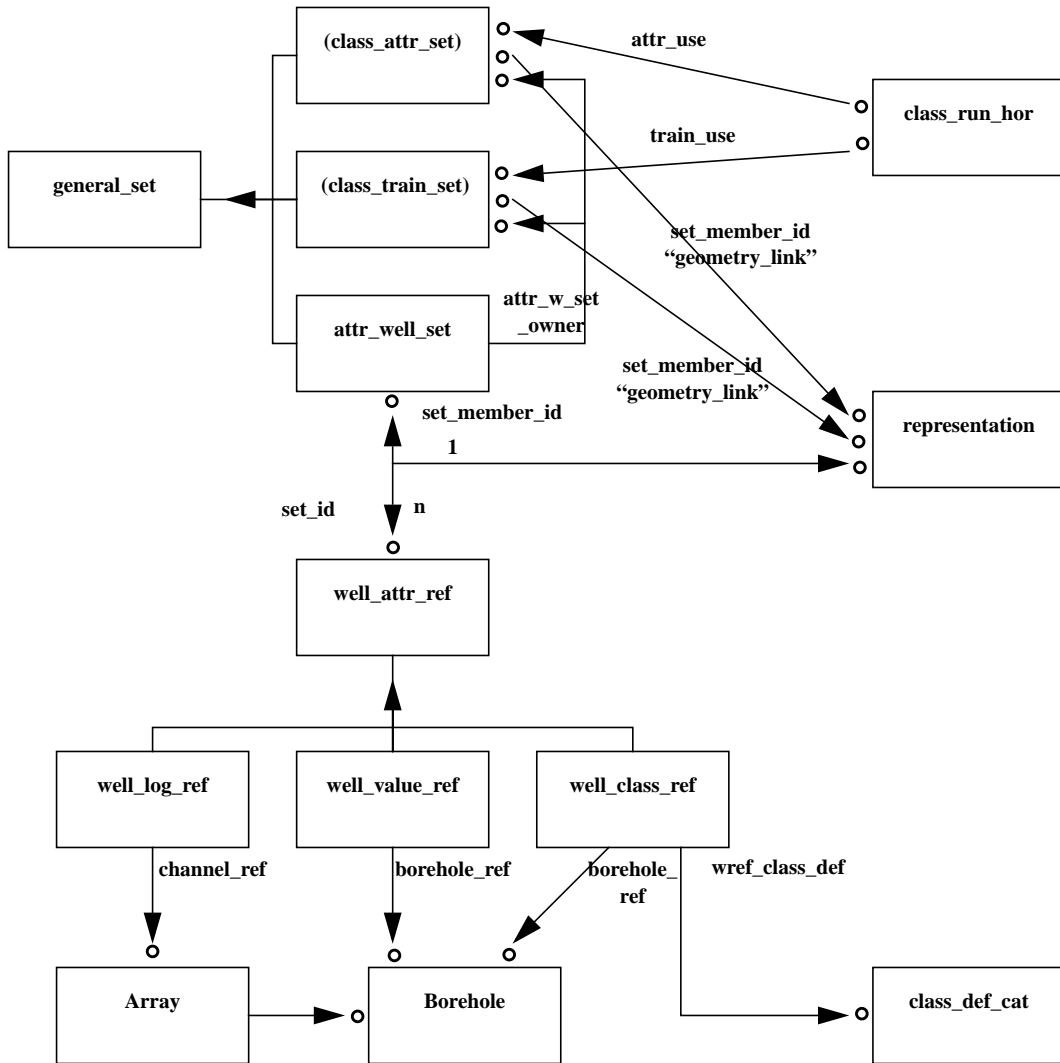


Figure 19: SeisClass Horizontal Classification Input Data Model

Input data for a horizontal classification is implemented by defining three new types of the **general_set** entity of the surface macro model submodel. The **class_attr_set** subtype defines a classification attribute selection, while the **class_train_set** subtype defines a classification Training/Validation data set. Both subtypes may optionally be used as input data to a horizontal classification run (*attr_use* and *train_use* relationships). Each of the two set types will have only one set member: A surface representation which defines the geometry link ??? for the selected data.

Note: All required attributes for **class_train_set** and **class_attr_set** are provided by the **general_set** supertype. Since these entities are accessed using DbGen they will not be defined as separate database tables, but only by using the **general_set**

table with the attribute set_type being set to 'class_attr_set' or 'class_train_set'.¹

The third new subtype of general_set is the attribute and well reference set, **attr_well_set**. This set is always owned by either a class_attr_set or a class_train_set. A class_train_set will be the owner of maximum one attr_well_set, while a class_attr_set may be the owner of many attr_well_sets. The set members of an attr_well_set consists of one surface representation and zero or more **well_attr_refs**.

The well_attr_ref entity defines a general relationship to some well data. The entity has three subtypes: A **well_log_ref** defines a relationship to a well log (GeoFrame Array). A **well_value_ref** defines a relationship to a “constant well log” which in terms is defined by a reference to a GeoFrame borehole and a constant value which is valid throughout the borehole. The third well_attr_ref subtype is **well_class_ref**, which defines a relationship to a “constant class log”. This relationship is defined as a reference to a GeoFrame borehole and a relationship to the class definition catalog, thus defining a class which is valid throughout the borehole.

11.1 Dbgen-supported tables

The general_set subtypes class_attr_set, class_train_set and attr_well_set will be supported by the DbGen access layer. The class_attr_set and class_train_set subtypes are implemented inside the general_set table itself, as illustrated in the table below.

attribute	valuetype	description
project#	int	The project number
id	int	Unique id for this instance
set_name	char(20)	User defined name for this instance
set_type	char(16)	Type of set: "class_attr_set" or "class_train_set" (or some other subtype)
create_date	char(19)	Date the instance was created
created_by	char(16)	The user who created the instance

Table 1: general_set attribute listing

1. When implementing CAL-supported DataEntities, a separate table must be created for all subtypes even if they have no attributes of their own.

attribute	valuetype	description
source	char(16)	Program/module that created the instance
description	char(80)	User defined field

Table 1: general_set attribute listing

The attr_well_set entity will be implemented as a separate table. The table will contain the foreign key attribute that implements the attr_w_set_owner relationship.

attribute	valuetype	description
project#	int	The project number
id	int	Unique id for this instance
attr_w_set_owner	int	Id of general_set that owns this attr_well_set

Table 2: attr_well_set attribute listing

The surface **representation** entity is also supported by DbGen. This entity is part of the GeoModel Surface Data Model and is not described in detail in this document.

11.2 CAL-Supported DataEntities

The remaining entities in the SeisClass Data Model are supported by CAL. The CAL Schema (attribute definitions) for each DataEntity is provided in cs_documents/geomodel_ref_40.fm.

Seismic Data Model

12.1 Seismic Activity Data Model

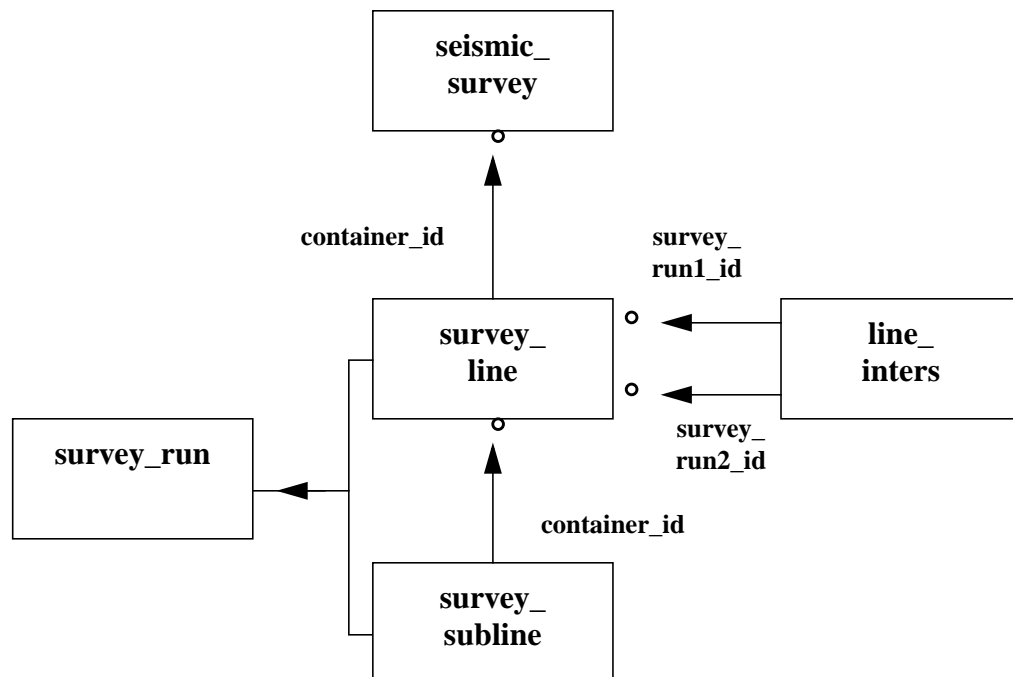


Figure 20: GeoModel 4.0 Seismic Activity Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.2 Seismic Representation Subtypes

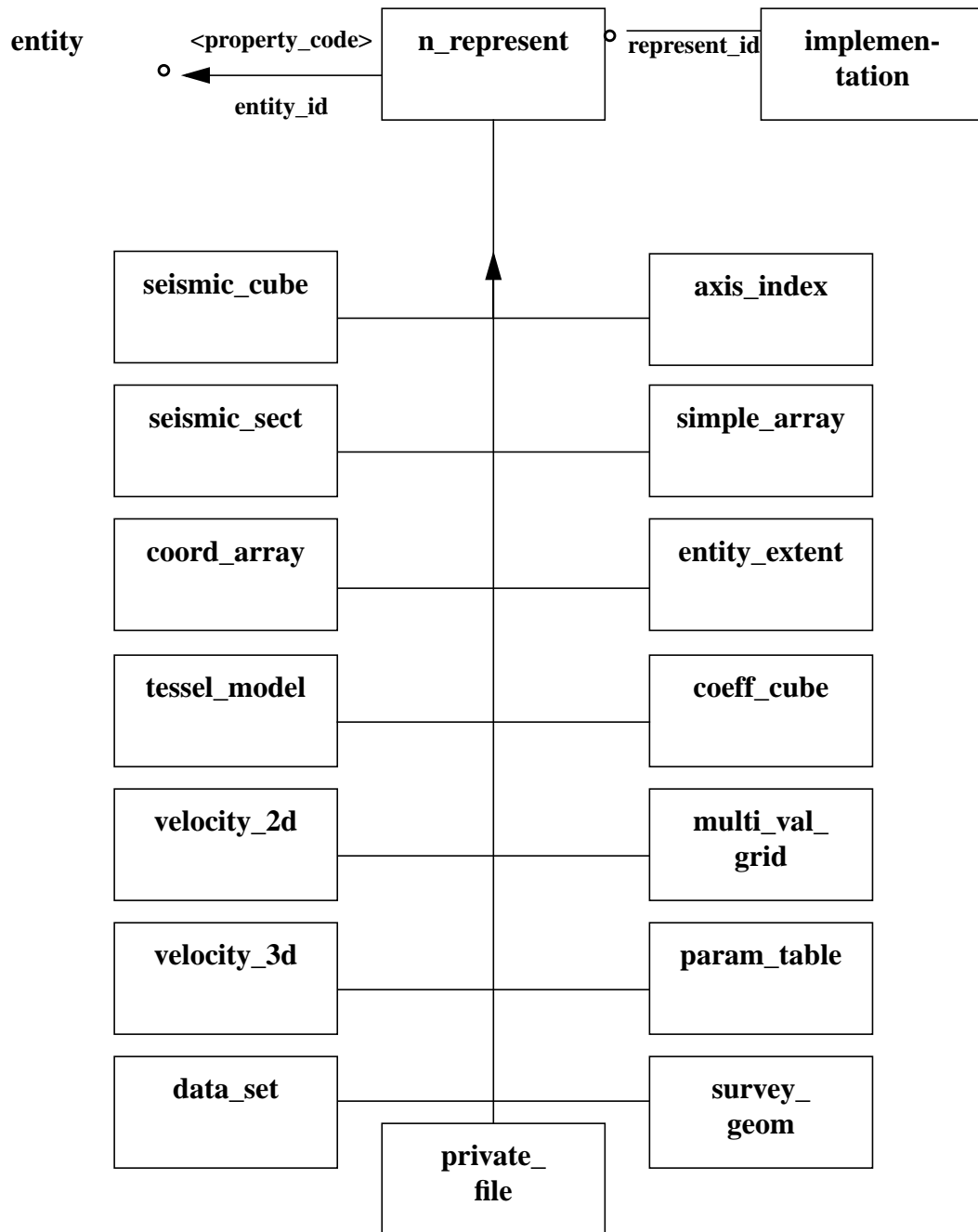


Figure 21: GeoModel 4.0 Seismic Representation Subtypes¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.3 Seismic Implementation Subtypes

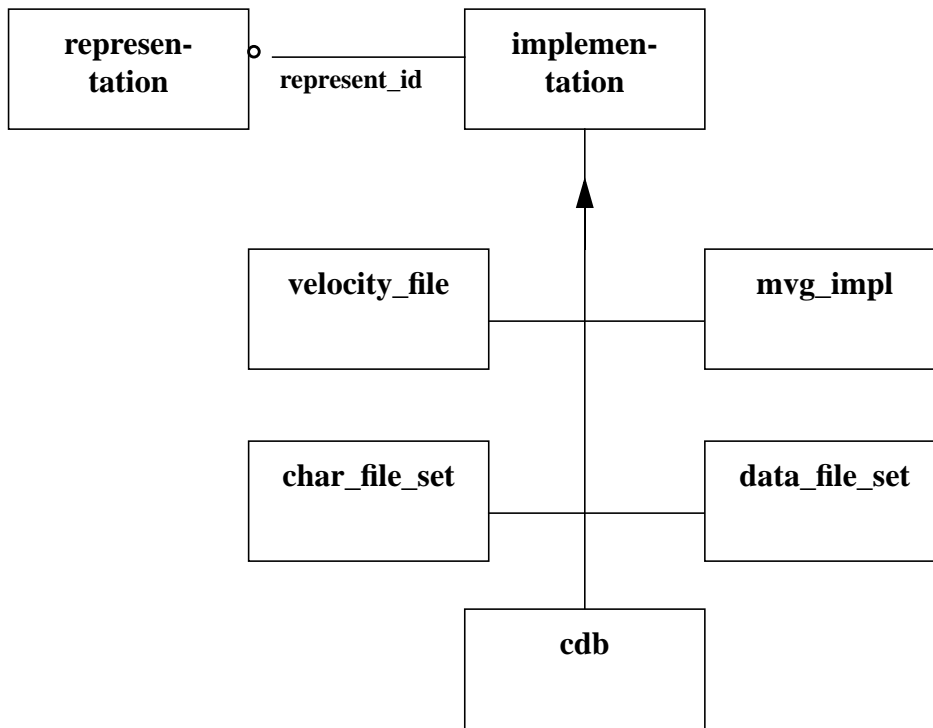


Figure 22: GeoModel 4.0 Seismic Implementation Subtypes¹

1. The entity descriptions are given in `cs_documents/geomodel_ref_40.fm`

12.4 axis_index Data Model

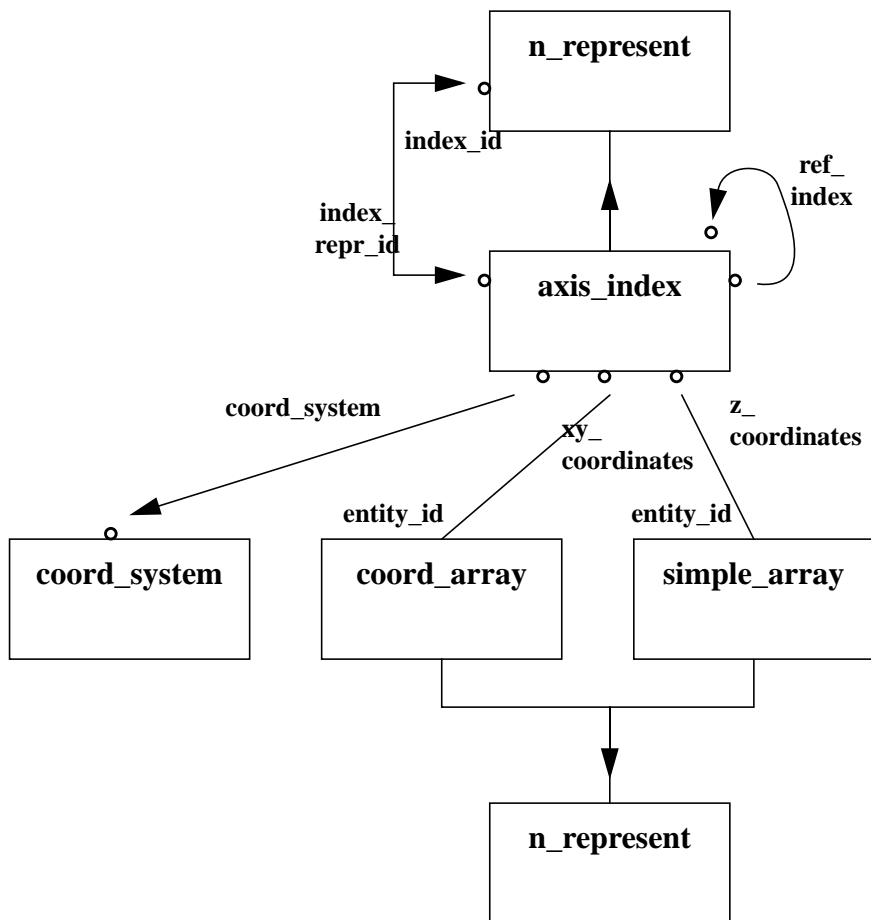


Figure 23: GeoModel 4.0 axis_index Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.5 coeff_cube Data Model

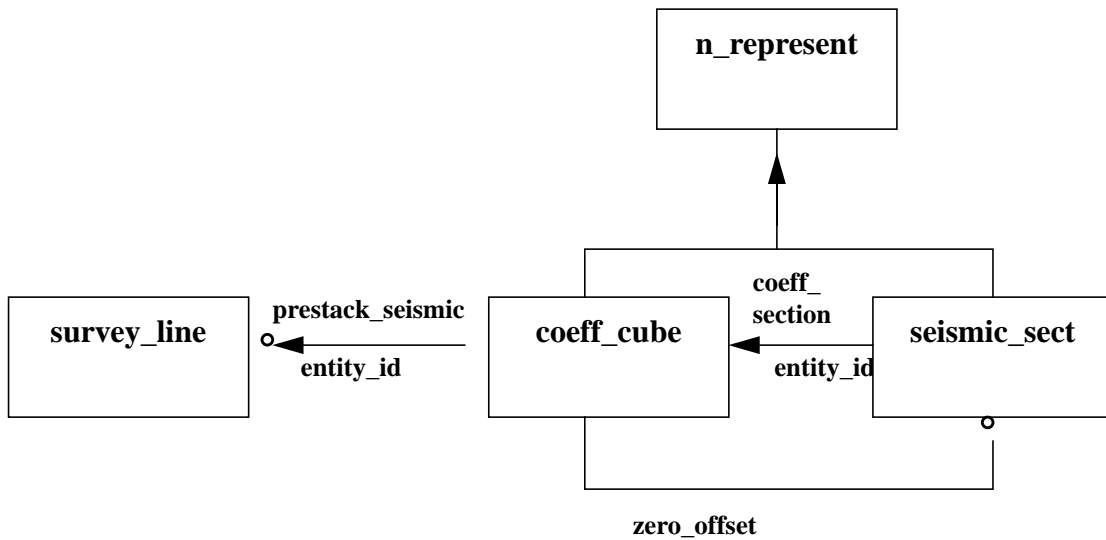


Figure 24: GeoModel 4.0 coeff_cube Data Model¹

12.6 param_table Data Model

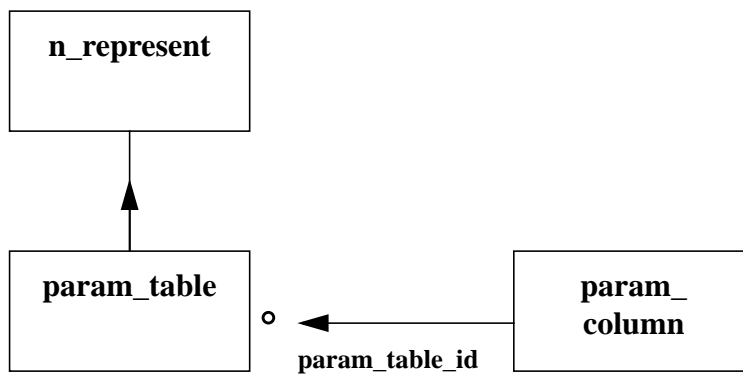


Figure 25: GeoModel 4.0 param_table Data Model²

-
1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm
 2. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.7 Charisma Seismic Data Model

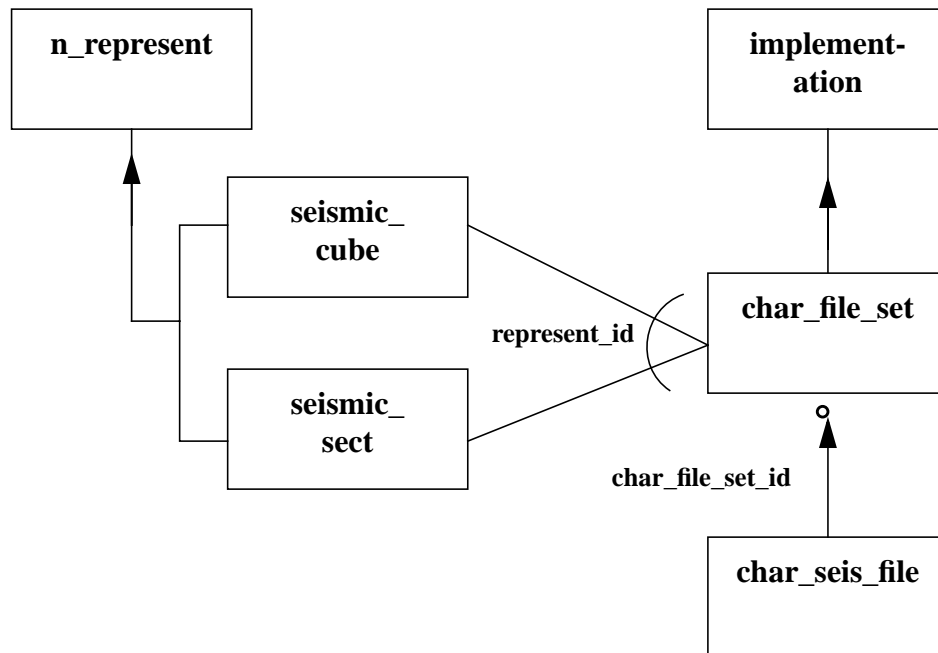


Figure 26: GeoModel 4.0 Charisma Seismic Data Model¹

1. The entity descriptions are given in `cs_documents/geomodel_ref_40.fm`

12.8 Trace Group List Data Model

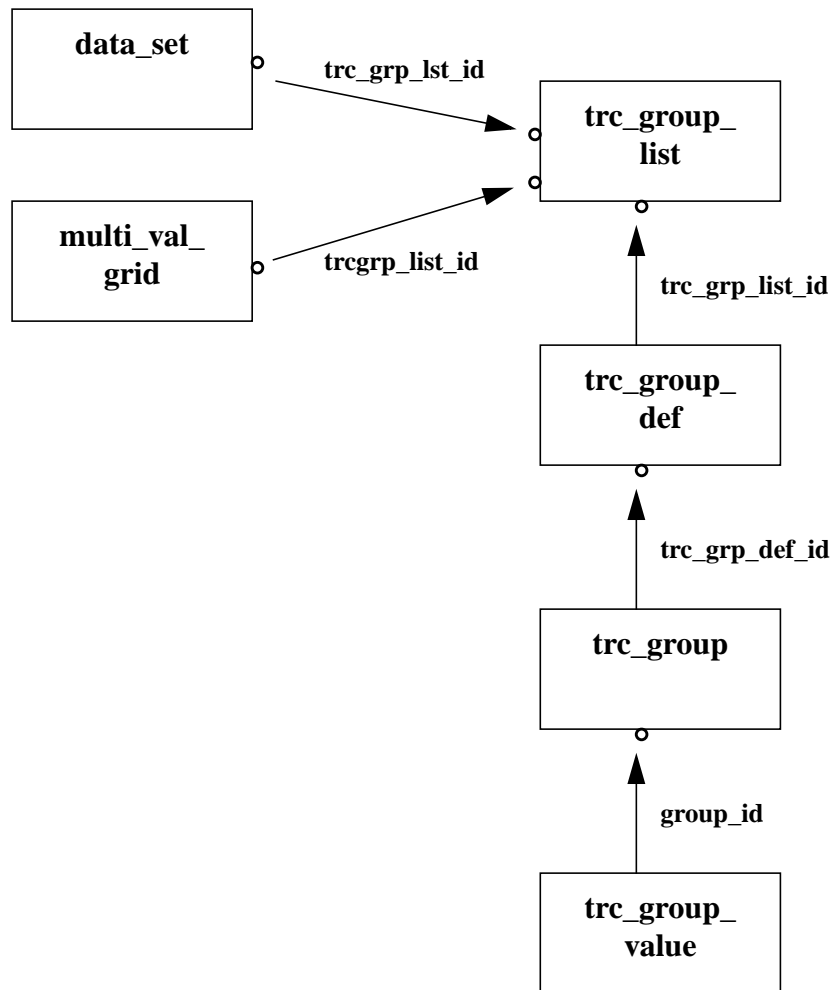


Figure 27: GeoModel 4.0 Seismic Trace Group List Data Model¹

1. The entity descriptions are given in `cs_documents/geomodel_ref_40.fm`

12.9 data_file_set Data Model

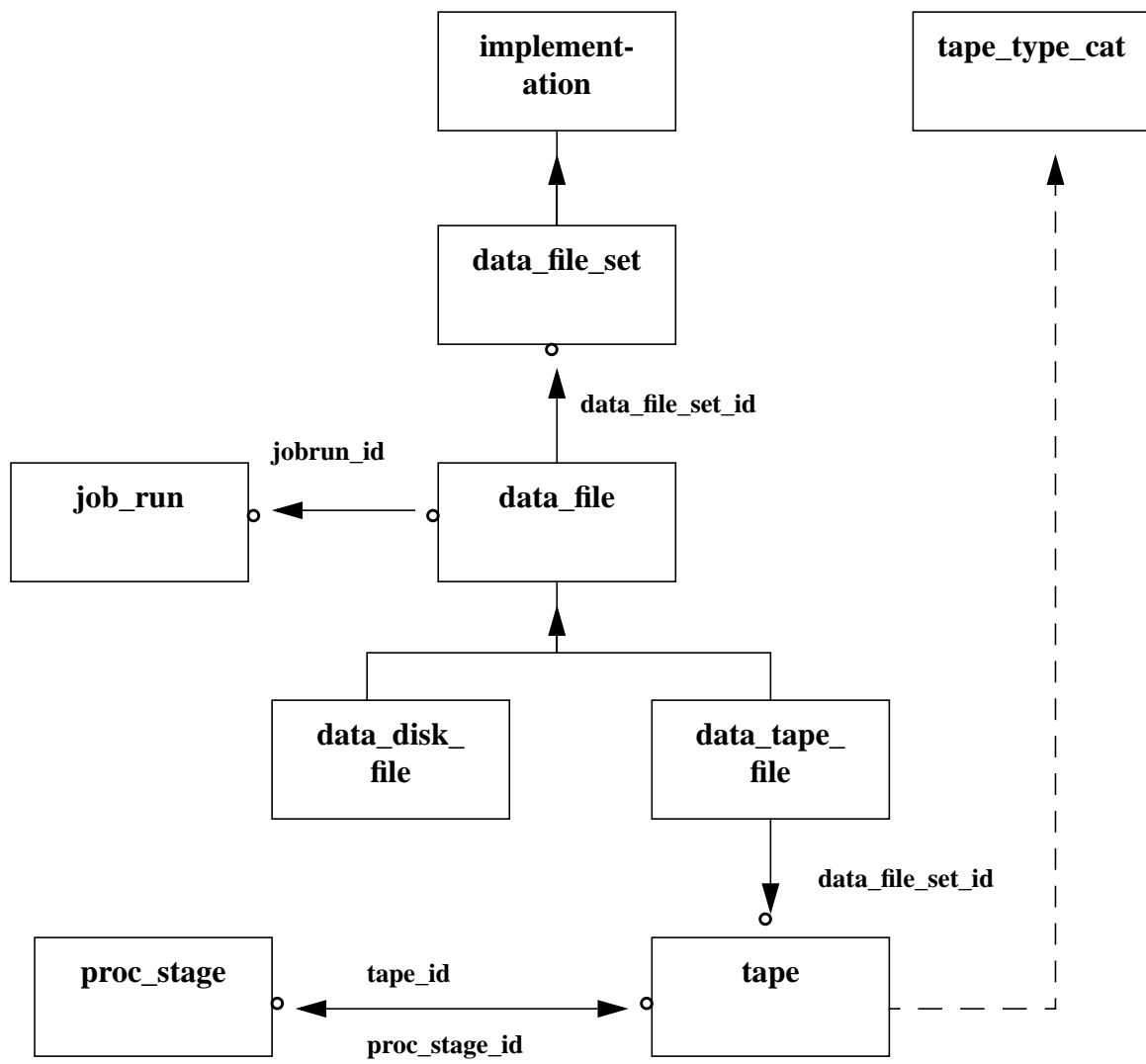


Figure 28: GeoModel 4.0 data_file_set Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.10 data_set Data Model

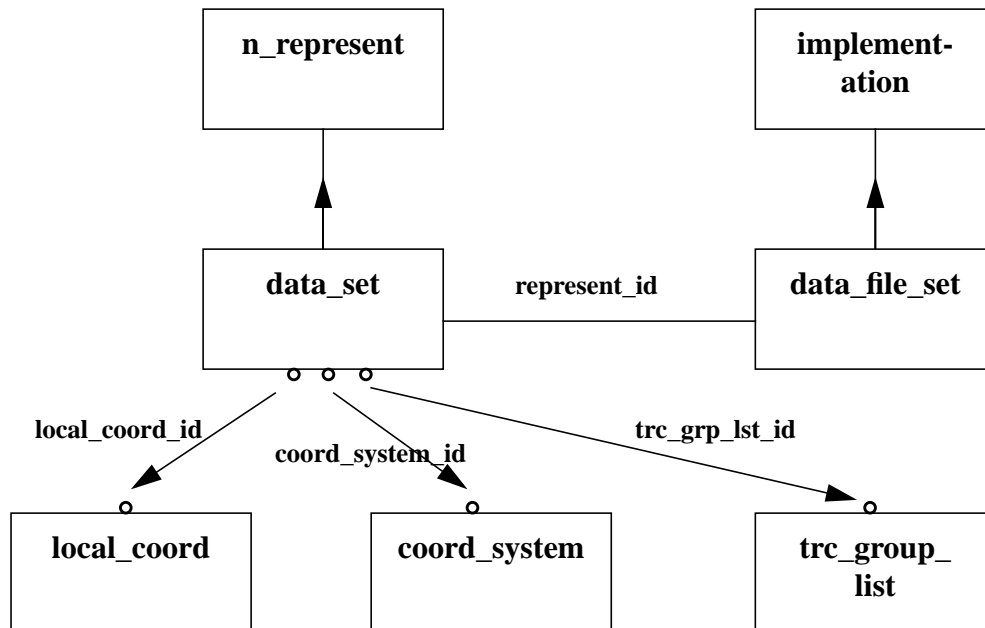


Figure 29: GeoModel 4.0 data_set Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.11 Multi Value Grid Data Model

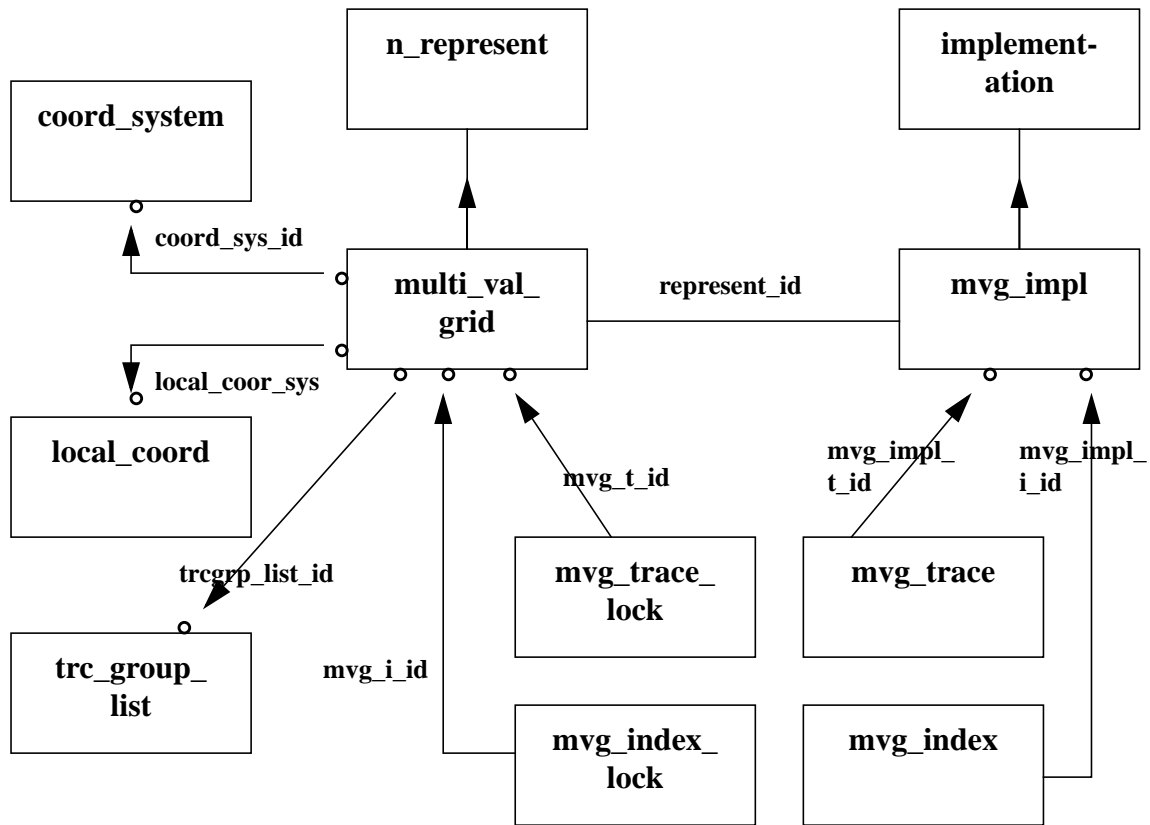


Figure 30: GeoModel 4.0 Multi Value Grid Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

12.12 Velocity Field Data Model

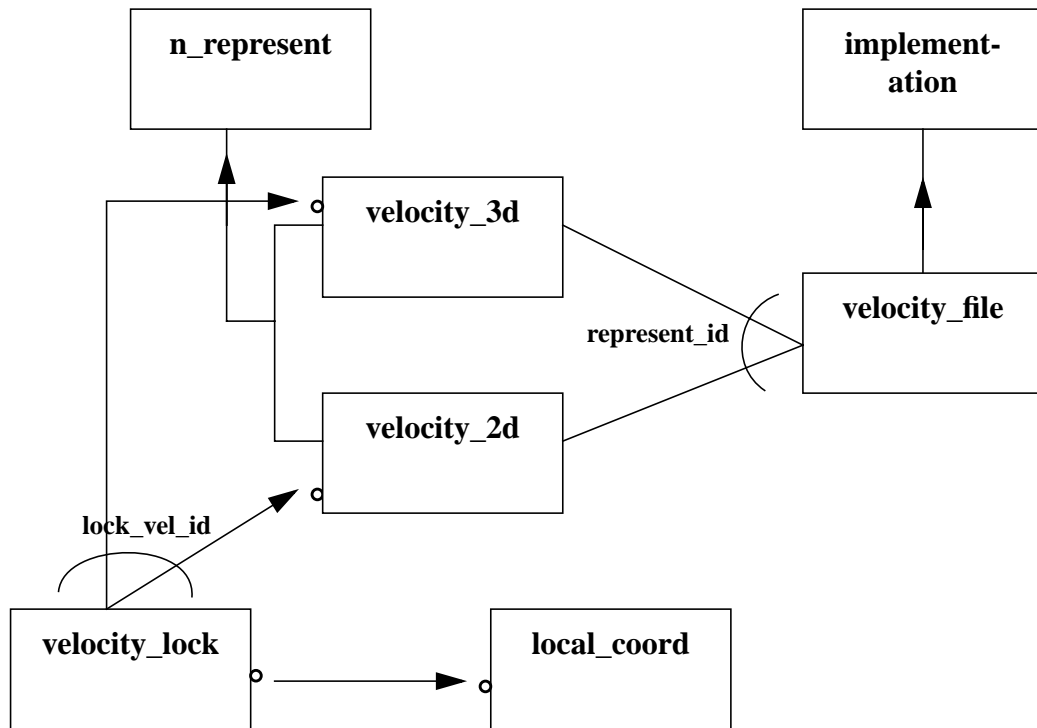


Figure 31: GeoModel 4.0 velocity field Data Model¹

1. The entity descriptions are given in `cs_documents/geomodel_ref_40.fm`

13.1 Binset and Project grid data model

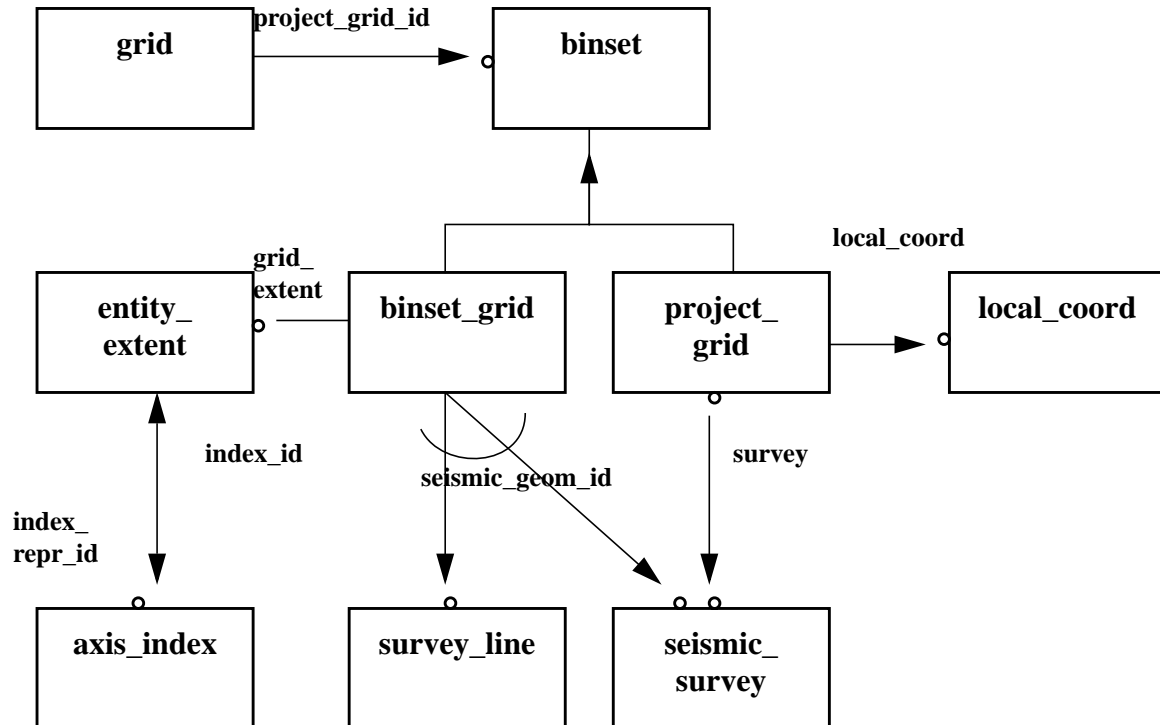


Figure 32: GeoModel 4.0 Binset Data Model¹

1. The entity descriptions are given in cs_documents/geomodel_ref_40.fm

Unit Data Model

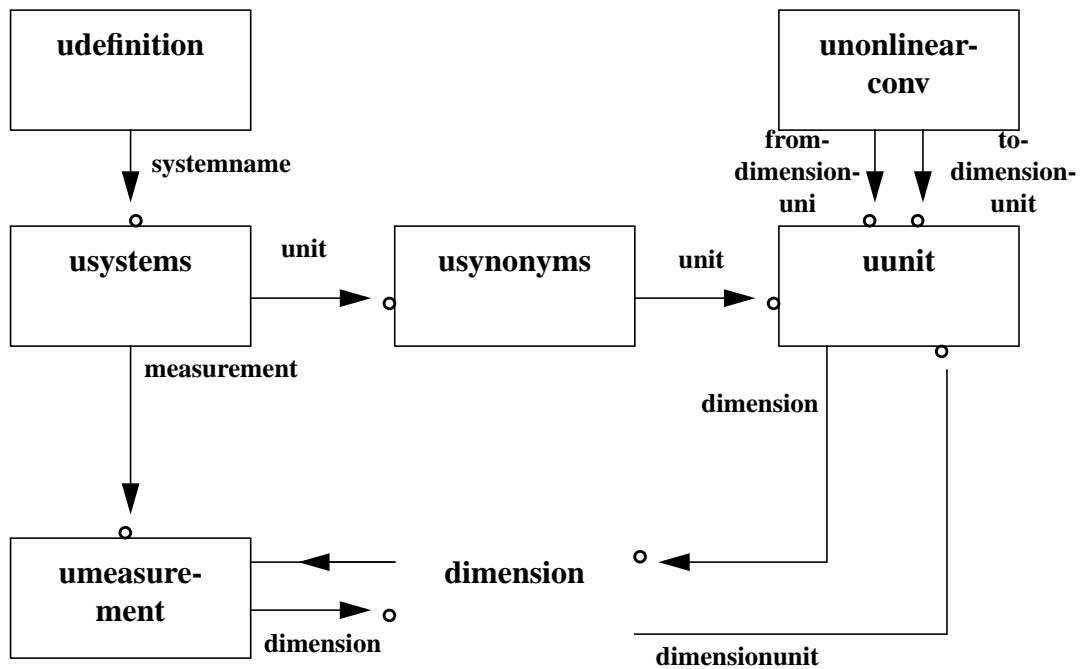


Figure 33: GeoModel 4.0 Unit Data Model¹

1. The tables are described in dbgen_sql/gmg_unit.sqlp