
Geographic information — Feature concept dictionaries and registers

*Information géographique — Dictionnaires de concepts d'entités et
registres*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 287, *Geographic Information*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 19126:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the UML diagrams has been improved to conform to the current style and the UML to the ISO/TC 211 Harmonized Model for both the 2009 version and this document has been added;
- minor updates have been made to take into account changes to other standards, particularly ISO 19135-1.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document specifies a schema for geographic feature concept dictionaries managed as registers. As described in ISO 19101-1, geographic features are abstractions of real world phenomena associated with a location relative to the surface of the earth, about which data are collected, maintained and disseminated.

A feature concept dictionary provides basic definitions and related information about a set of concepts that may be used to describe geographic features and shared across multiple application areas. Elements from a feature concept dictionary can be reused in one or more feature catalogues. A feature catalogue is often associated with a particular application schema, product specification and data set. It provides a complete textual specification of a set of feature types and their properties and relationships. See [Annex A](#) for further discussion of the relationships between feature concept dictionaries, feature catalogues, application schemas and product specifications.

ISO 19135-1 specifies procedures for the registration of items of geographic information. Items of geographic information that can be registered are members of object classes specified in other standards. This document defines object classes and specifies rules used to establish and maintain feature concept dictionaries as ISO 19135-1 conformant register schemas.

ISO 19135-1 specifies the structure of a hierarchical register in which the principal register holds a set of items that describe the subregisters. This document specifies a schema for a hierarchical register where the subregisters are feature concept dictionaries and/or feature catalogues. This document specifies an accompanying schema. The resulting hierarchical register can be used as a basis for harmonization and the establishment of interoperability between different geographic information communities.

Feature concept dictionaries and feature catalogues maintained as registers can serve as sources of reference for similar registers established by other geographic information communities as part of a system of cross-referencing. Cross-referencing between respective items in registers of items of geographic information can be difficult in cases where the structure of registers differs between information communities. This document can serve as a guide for different information communities to develop compatible registers that can support a system of geographic information cross-referencing.

Geographic information — Feature concept dictionaries and registers

1 Scope

This document specifies a schema for feature concept dictionaries to be established and managed as registers. It does not specify schemas for feature catalogues or for the management of feature catalogues as registers. However, as feature catalogues are often derived from feature concept dictionaries, this document does specify a schema for a hierarchical register of feature concept dictionaries and feature catalogues. These registers are in accordance with ISO 19135-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 19103:2015, *Geographic information — Conceptual schema language*

ISO 19115-1, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19135-1:2015, *Geographic information — Procedures for item registration — Part 1: Fundamentals*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

compound registry

registry (3.20) containing multiple *registers* (3.19) that share the same *item classes* (3.17) and coordinated management of a common characteristic

Note 1 to entry: The common characteristic can be a shared namespace for the assignment of names and/or codes.

3.2

data product

dataset or dataset series that conforms to a *data product specification* (3.3)

[SOURCE: ISO 19131:2007, 4.6]

3.3

data product specification

detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party

[SOURCE: ISO 19131:2007, 4.7, modified — The Note has been removed.]

3.4

data type

specification of a *value domain* (3.22) with operations allowed on values in this domain

[SOURCE: ISO 19103:2015, 4.14, modified — Note 1 to entry and the Example have been removed.]

3.5

feature

abstraction of real world phenomena

EXAMPLE The phenomenon named “Eiffel Tower” may be classified with other similar phenomena into a feature type named “tower”.

Note 1 to entry: A feature can occur as a type or an instance. In this document, feature type is meant unless otherwise specified.

Note 2 to entry: This document does not address real world phenomena directly. It addresses only their abstractions (feature concepts and feature types) and feature instances (data collected to represent a feature in conformance with a specified feature type).

[SOURCE: ISO 19101-1:2014, 4.1.11, modified — Note 2 to entry and the Example have been added.]

3.6

feature association

relationship that links instances of one *feature* (3.5) type with instances of the same or a different feature type

Note 1 to entry: A feature association can occur as a type or an instance. In this document, feature association type is meant unless otherwise specified.

[SOURCE: ISO 19110:2016, 3.3 modified — Note 1 to entry has been added.]

3.7

feature association concept

concept that can be specified in detail as one or more *feature association* (3.6) types

EXAMPLE A “supports” feature association concept describes a relationship between real world phenomena such as “highways” and “bridges” where the role of one feature is that it is *supported-by* the other feature (whose role is *supporter-of*).

3.8

feature attribute

characteristic of a feature

EXAMPLE 1 A feature attribute named “colour” can have an attribute value “green” which belongs to the data type “text”.

EXAMPLE 2 A feature attribute named “length” can have an attribute value “82,4” which belongs to the data type “real”.

Note 1 to entry: A feature attribute has a name, a data type and a value domain associated to it. A feature attribute for a feature instance also has an attribute value taken from the value domain.

Note 2 to entry: A feature attribute can occur as a type or an instance. In this document, feature attribute type is meant unless otherwise specified.

[SOURCE: ISO 19101-1:2014, 4.1.12, modified — Note 2 to entry has been changed and Note 3 to entry has been removed.]

3.9

feature attribute concept

concept that can be specified in detail as one or more *feature attribute* (3.8) types

EXAMPLE A “height” feature attribute concept describes length in the vertical direction as a characteristic that can be shared by real world phenomena such as “human”, “tree” and “building.”

3.10

feature catalogue

catalogue containing definitions and descriptions of the *feature* (3.5) types, *feature attributes* (3.8), and feature relationships occurring in one or more sets of geographic data, together with any *feature operations* (3.13) that can be applied

[SOURCE: ISO 19101-1:2014, 4.1.13]

3.11

feature concept

concept that can be specified in detail as one or more *feature* (3.5) types

EXAMPLE The feature concept “road” can be used to specify several different feature types, each with a different set of properties appropriate for a particular application. For a travel planning application, it can have a limited set of attributes such as name, route number, location and number of lanes, while for a maintenance application it can have an extensive set of attributes detailing the structure and composition of each of the layers of material for which it is composed.

3.12

feature concept dictionary

dictionary that contains definitions of, and related descriptive information about, concepts that can be specified in detail in a *feature catalogue* (3.10)

3.13

feature operation

operation that every instance of a *feature* (3.7) type may perform

EXAMPLE A feature operation upon a “dam” is to raise the dam. The results of this operation are to raise the height of the “dam” and the level of water in a “reservoir”.

Note 1 to entry: The values of feature attributes of feature instances are affected by feature operations.

[SOURCE: ISO 19110:2016, 3.7 modified — Note 1 to entry has been changed.]

3.14

feature operation concept

concept that can be specified in detail as one or more *feature operation* (3.13) types

EXAMPLE A “traffic flow” operation can return the number of persons or vehicles expected to move on or through some kind of transportation feature during a period of time specified as input to the operation.

3.15

hierarchical register

structured set of *registers* (3.19) for a domain of register items, composed of a principal register and a set of *subregisters* (3.21)

EXAMPLE The ISO 6523 series is associated with a hierarchical register. The principal register contains organization identifier schemes and each subregister contains a set of organization identifiers that comply with a single organization identifier scheme.

[SOURCE: ISO 19135-1:2015, 4.1.4 modified — Example updated]

3.16

identifier

linguistically independent sequence of characters capable of uniquely and permanently identifying that with which it is associated

[SOURCE: ISO 19135-1:2015, 4.1.5]

3.17

item class

set of items with common properties

Note 1 to entry: Class is used in this context to refer to a set of instances, not the concept abstracted from that set of instances.

Note 2 to entry: To avoid potential ambiguity in this document, the expression “register item class” is used.

[SOURCE: ISO 19135-1:2015, 4.1.7 modified — Note 2 to entry has been added.]

3.18

nominal value

name of an object, type, or category

EXAMPLE “Deciduous needle leaf” is a nominal value that identifies a vegetation type.

Note 1 to entry: Many feature attributes take nominal rather than numerical values. The value domain of such an attribute is usually specified as an enumeration or a code list.

3.19

register

set of files containing *identifiers* ([3.16](#)) assigned to items with descriptions of the associated items

[SOURCE: ISO 19135-1:2015, 4.1.9]

3.20

registry

information system on which a *register* ([3.19](#)) is maintained

[SOURCE: ISO 19135-1:2015, 4.1.13]

3.21

subregister

part of a *hierarchical register* ([3.15](#)) that contains items from a partition of a domain of information

[SOURCE: ISO 19135-1:2015, 4.1.16]

3.22

value domain

set of accepted values

[SOURCE: ISO 19103:2015, 4.37 modified — The Example has been removed.]

4 Conformance

4.1 General

To conform to this document, all of the conditions specified for at least one of the two conformance classes described in the following subclauses shall be satisfied.

4.2 Conformance for a feature concept dictionary

Any feature concept dictionary that claims conformance to this document shall satisfy all of the conditions specified in the following abstract test suites:

- a) ISO 19135-1:2015, A.1, for general conformance to ISO 19135-1; and
- b) Subclause [A.2](#).

4.3 Conformance for a register of feature concept dictionaries and/or feature catalogues

Any register of feature concept dictionaries and/or feature catalogues that claims conformance to this document shall satisfy all of the conditions specified in the following abstract test suites:

- a) ISO 19135-1:2015, A.1, for general conformance to ISO 19135-1;
- b) ISO 19135-1:2015, A.3, for conformance to ISO 19135-1 as a hierarchical register; and
- c) Subclause [A.3](#).

5 Concepts

5.1 General

A feature concept dictionary describes concepts that can be used to characterize real-world phenomena. Feature types and feature property types can then be specified using these concepts and documented in a feature catalogue. This document specifies a feature concept dictionary schema ([5.2](#) and [Clause 6](#)).

ISO 19135-1 specifies procedures to be followed in preparing and maintaining registers of items of geographic information. Such registers can be used to support discovery of, access to, and use of the contents of feature concept dictionaries and feature catalogues. This document specifies a schema for feature concept dictionaries as registers and information that shall be included in item registration proposals ([Annex B](#)).

A single authority may need to establish a suite of coordinated feature concept dictionary registers and feature catalogue registers that share a common structure, coding scheme and/or community of interest. This document specifies a compound registry mechanism to support such requirements ([5.3.3](#)).

Feature concept dictionaries and feature catalogues maintained as registers may serve as sources of reference for similar registers established by other geographic information communities as part of a system of cross-referencing. Feature concept dictionary registers and feature catalogue registers from different communities may be organized as partitions of a hierarchical register. Based on ISO 19135-1, this document specifies a schema for a hierarchical register of feature concept dictionaries and feature catalogues ([5.5](#) and [Clause 8](#)) and information to be included in item registration proposals.

5.2 Feature concept dictionary

The set of concepts of a feature concept dictionary includes feature concepts, feature attribute concepts, feature association concepts, feature operation concepts and nominal value concepts that may be included in the value domain of a feature attribute concept. Feature types may then be specified using these concepts and documented in a feature catalogue.

The schema presented in [Clause 6](#) of this document provides a detailed specification of the content of feature concept dictionaries.

5.3 Registers

5.3.1 Overview

Registers provide a basis for the flexible management of items. Feature concept dictionaries and feature catalogues managed as registers may be published electronically, enabling the discovery and direct use of their contents. They can also be easily extended and used as a basis for harmonization and the establishment of interoperability between different geographic information communities.

5.3.2 Register structure

ISO 19135-1 specifies several alternatives for structuring registers.

- a) A simple register contains items of a single item class. This is the simplest structure to manage, since the same elements of information are recorded for all items in the register, and it imposes a smaller cost burden on any one register manager. A disadvantage, for any organization that wishes to establish registers for multiple item classes, is that it may scatter such registers across several register managers.
- b) A multi-part register contains items from different item classes. It is organized into sections based on the different elements of information recorded for each class. For example, a feature catalogue that conforms to ISO 19110 may be instantiated as a multi-part register. Such a register would include distinct item classes for feature types, for feature attributes, for feature associations, and for feature operations.
- c) A hierarchical register is a structured set of registers composed of a principal register and one or more subregisters (ISO 19135-1:2015, Clause 8). The principal register holds a set of items that describe the subregisters. Each of the subregisters holds a set of register items from a partition of the information domain.

This document specifies schemas for both multi-part registers (feature concept dictionaries) and hierarchical registers (registers of feature concept dictionaries and/or feature catalogues).

5.3.3 Compound registry

An authority can need to establish a suite of coordinated registers that share a common structure but are separated into individual registers within a compound registry. A compound registry contains several registers, each of which may be simple, multi-part or hierarchical, as described in [5.3.2](#).

EXAMPLE 1 A single community of interest may have geographic information requirements from several scientific disciplines. Each discipline can be best handled by a separate set of experts and/or authorities. For each, a separate control body, register manager and/or register owner can be desirable. While the individuals and organizations responsible for the management of the registers may differ, the resulting collection of geographic information is intended to be used “as a whole” even though its management is partitioned; this goal is facilitated by a common register structure. Proposals for new information items can be sent to the registry “as a whole” and then directed to the register manager responsible for the appropriate scientific discipline.

EXAMPLE 2 Several communities of interest can establish their own geographic information registers. They can require the ability to interchange geographic information according to a common encoding method. It is desirable that a single namespace for assignment of names (or codes) be established across the communities of interest. A common policy is developed so that names (or codes) are assigned by register managers (or control bodies) for each register in a coordinated manner. Possible policies include pre-allocation of portions of the namespace or dynamic assignment (and deconfliction) as proposals are received and acted on. Shared register structure facilitates the establishment of common data product and/or information content specifications among the disparate communities of interest.

This document specifies a compound registry mechanism to support such requirements.

- a) A compound registry shall contain multiple registers that share the same item classes.
- b) The register shall share a “common characteristic”.

c) The register owners shall have agreed to coordinated management of the “common characteristic”.

Figure 1 shows the organizational relationships (ISO 19135-1:2015, 5.1) of a compound registry. The registry contains four registers, each with a separate control body. A single register manager under the authority of a single register owner coordinates the acceptance and management of proposals for item registration. The user accesses a single registry in order to obtain information from any of the registers.

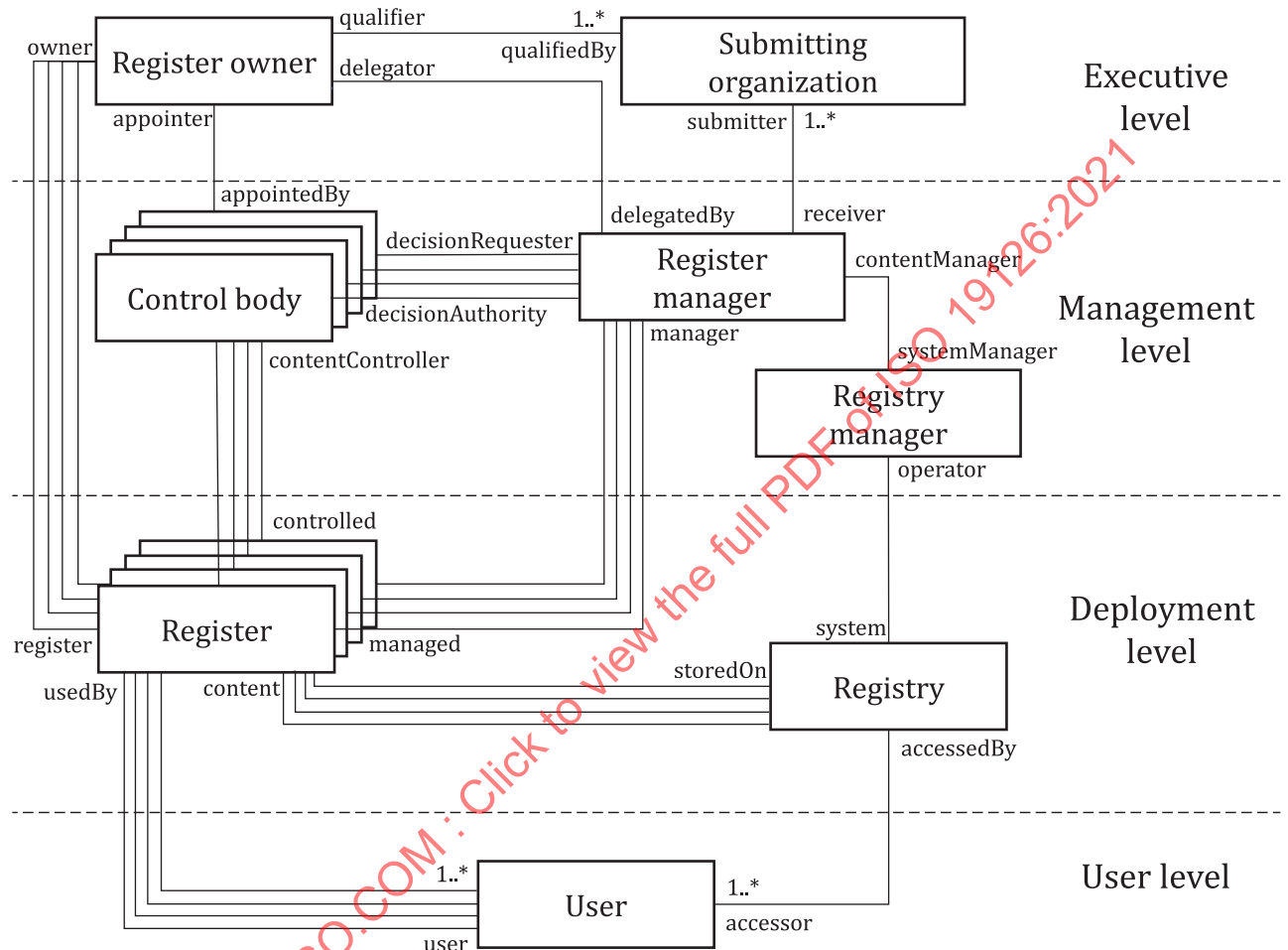


Figure 1 — Example compound registry (ISO 19135-1:2015, 5.1)

5.3.4 Register management and registration

Registers shall be managed as per ISO 19135-1:2015, Clause 5 and the information that shall be included in any proposal for registration of an item of geographic information (ISO 19135-1:2015, Annex E).

ISO 19135-1:2015, Annex D specifies the information necessary to submit a proposal to the manager of a feature concept dictionary register or a register of feature concept dictionaries and/or feature catalogues.

5.4 Feature concept dictionary register

A feature concept dictionary register shall consist of:

- information about the feature concept dictionary as a whole (including ownership and access);
- the registered items (6.1); and

- information necessary to manage individual items in the register (including item identifier and management status).

ISO 19135-1:2015, Annex D specifies the information to be included in proposals for item registration in feature concept dictionary registers.

5.5 Register of feature concept dictionary and feature catalogue registers

Collections of items of geographic information may be established as a hierarchical register. This document specifies a register of feature concept dictionaries and feature catalogues as a principal register. Subregisters establish individual feature concept dictionaries or feature catalogues. [Clause 8](#) specifies a hierarchical register that may be used as a basis for harmonization and the establishment of interoperability between different geographic information communities.

[Clause 8](#) specifies the item classes to be included in the top level of a hierarchical register of feature concept dictionary registers and feature catalogues. ISO 19135-1:2015, Annex D specifies the information to be included in proposals for item registration in registers of feature concept dictionaries and feature catalogues.

5.6 Relationship to data product specifications and application schemas

A data product specification (ISO 19131) defines the requirements for a geographic data product. These requirements form the basis for producing or acquiring data and also allow users to evaluate the data product to determine whether it fulfils their requirements. A data product specification contains multiple major sections, including one on data content and structure.

The content information of a feature-based data product is specified in terms of an application schema and a feature catalogue (ISO 19131:2007, 10.1). The feature catalogue may be either specified within the data product specification or reference may be made to an externally specified feature catalogue. A feature catalogue may contain references to items in an externally specified feature concept dictionary.

An application schema is a conceptual schema for data required by one or more applications (ISO 19101-1:2014, 4.1.2). An application schema may be developed from a feature catalogue or it may contain references to items in an externally specified feature catalogue.

The schema for the establishment and use of feature concept dictionaries specified in this document ([Clause 6](#)) supports referencing of contained items by feature catalogues included within or used by data product specifications and application schemas.

5.7 Community implementations

There are many different community requirements for collections of information about features. These include:

- general-purpose feature concept dictionaries establishing a well-known reference set of concepts;
- specialized feature concept dictionaries that establish concepts that are community-unique, but may be “promoted” to become part of the shared reference set concepts at a future date. In order to not preclude future promotion, it is desirable that such concepts do not conflict with those in existing reference feature concept dictionaries;
- mappings and/or correspondences between concepts in different feature concept dictionaries, especially those on which significant geographic information data repositories depend. This supports both data exchange in the present and identifies a future path for feature concept dictionary integration;

- d) general-purpose feature catalogues establishing a well-known reference set of feature types and inheritance relations that support a variety of data interchange requirements. Such catalogues may be:
 - 1) self-contained; or
 - 2) reference concepts from external feature concept dictionaries;
- e) specialized feature catalogues establishing the feature content and structure of data product specifications and/or application schemas. Such catalogues may be:
 - 1) self-contained;
 - 2) reference feature types and inheritance relations from external general-purpose feature catalogues; or
 - 3) reference concepts from external feature concept dictionaries;
- f) mappings and/or correspondences between different specialized and/or general-purpose feature catalogues. This supports both data exchange in the present and identifies a future path for feature catalogue integration.

To support these requirements, communities of interest may establish individual registers of specific types, or may develop compound registries that facilitate a coordinated solution to multiple objectives.

5.8 Notation

The conceptual schemas specified in this document are described using the unified modelling language (UML)^[1], following the guidance of ISO 19103.

As specified in ISO 19103, names of UML classes, with the exception of basic data type classes, include a unique two-letter prefix that identifies the standard and the UML package in which the class is defined. Several model elements used in this document are defined in packages specified in other International Standards; these are given in [Table 1](#) along with the prefixes for the two packages specified in this document.

Table 1 — UML package identifiers

Prefix	Package
CI	Citation (ISO 19115-1)
FC	Feature catalogue (ISO 19110)
RE	Register (ISO 19135-1, Annex B)
CD	Feature concept dictionary
HR	Hierarchical feature information register

In accordance with the guidance of ISO 19103, all data element names are presented as character strings which combine multiple lowercase words as needed to form precise and understandable names without using any intervening characters (such as “_”, “-”, or space). For attributes and operation names, association roles, and parameters, capitalization is applied to the first letter of each word after the first word. For package, class, type-specification and association names, capitalization is also applied to the first letter of the first word.

Unless otherwise stated all data elements are mandatory.

5.9 Packages

The dependencies among packages specified or referenced in this document are identified in [Figure 2](#).

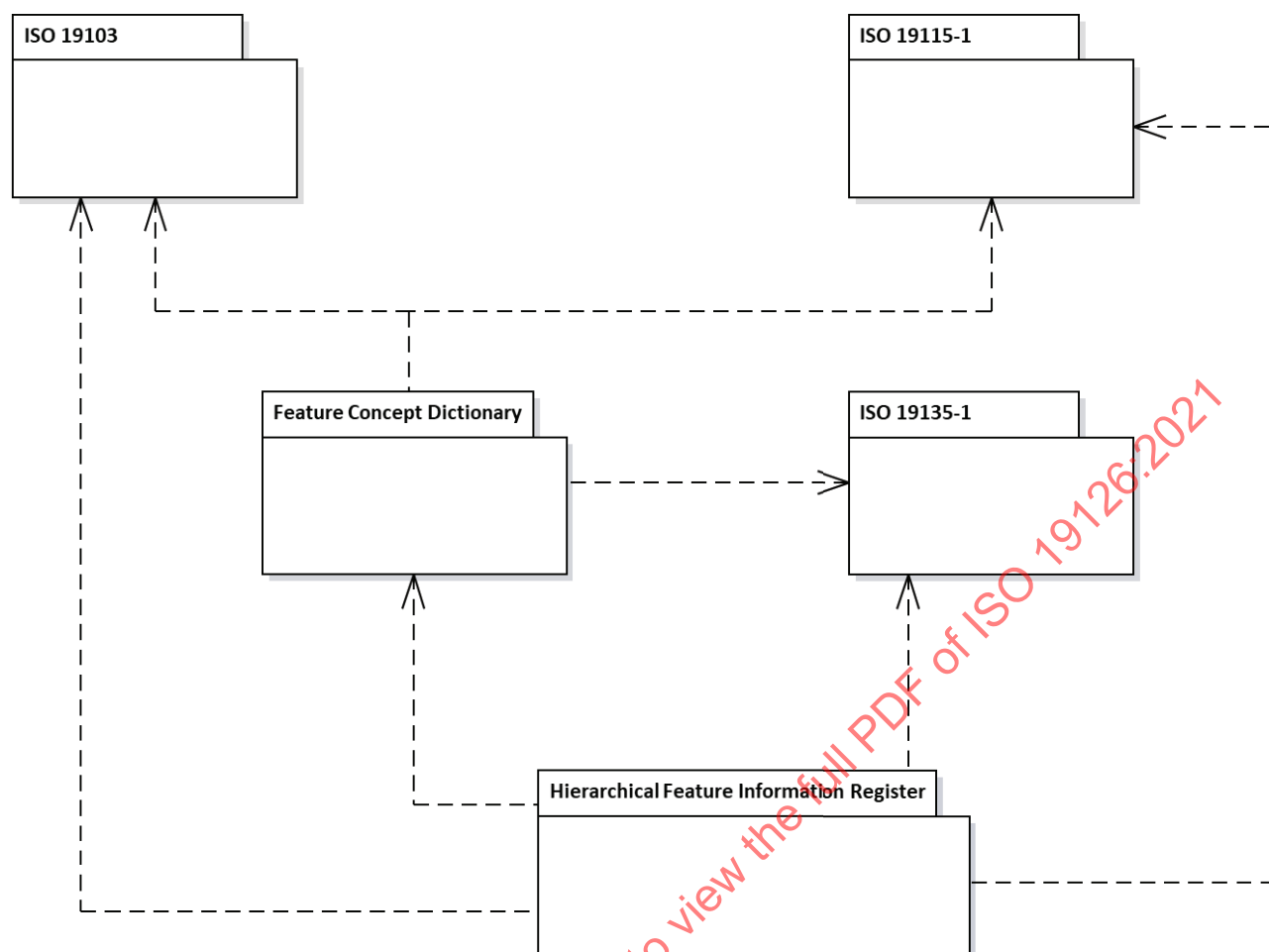


Figure 2 — Dependencies of packages specified in this document

6 Feature concept dictionary schema

6.1 General

This clause specifies the schema for a feature concept dictionary. Feature concept dictionaries may include definitions of:

- feature concepts;
- feature attribute concepts;
- feature association concepts;
- feature operation concepts;
- nominal value concepts.

The feature concept dictionary schema consists of one package, feature concept dictionary (CD), which specifies classes for describing concepts depicted in UML in [Figures 3 to 9](#).

Each class and data type are documented in a separate subclause. Where a class or data type uses or inherits from an element of another ISO standard, it is so identified and the manner in which the realization is achieved is specified.

The requirements for representing a feature concept dictionary has one requirement class, identified as <https://standards.iso211.org/iso19126/-/2/req/FeatureConceptDictionary/> (i.e. 19126FeatureConceptDictionary) and are listed in [Table 2](#).

Table 2 — Requirements class for FeatureConceptDictionary

Requirements class	
19126FeatureConceptDictionary = https://standards.iso211.org/iso19126/-/2/req/FeatureConceptDictionary/	
Target type	Concepts
Dependency	https://standards.iso.org/iso/19103/ed-2/en/ (Conceptual schema language)
Dependency	https://standards.iso.org/iso/19135/-/ed-2/en/ (Procedures for item registration – Fundamentals)
Requirement	19126FeatureConceptDictionary:CD_FeatureConceptDictionary
Requirement	19126FeatureConceptDictionary:CD_Scope
Requirement	19126FeatureConceptDictionary:CD_Concept
Requirement	19126FeatureConceptDictionary:CD_ConceptRelationship
Requirement	19126FeatureConceptDictionary:CD_FeatureConcept
Requirement	19126FeatureConceptDictionary:CD_FeaturePropertyConcept
Requirement	19126FeatureConceptDictionary:CD_FeatureAttributeConcept
Requirement	19126FeatureConceptDictionary:CD_NominalValueConcept
Requirement	19126FeatureConceptDictionary:CD_FeatureAssociationConcept
Requirement	19126FeatureConceptDictionary:CD_FeatureRoleConcept
Requirement	19126FeatureConceptDictionary:CD_FeatureOperationConcept

6.2 CD_FeatureConceptDictionary

6.2.1 General

The class CD_FeatureConceptDictionary ([Figure 3](#)) specifies information about the feature concept dictionary itself.

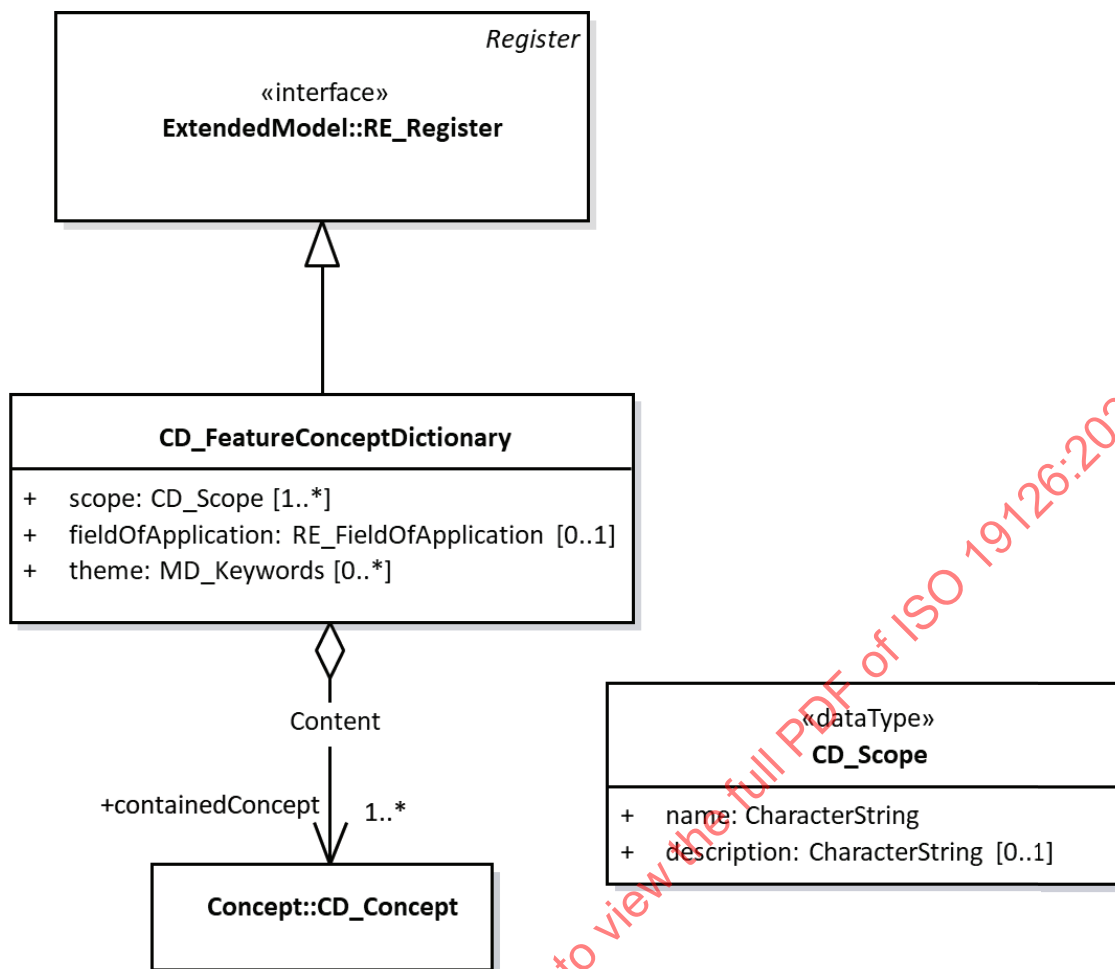


Figure 3 — CD_FeatureConceptDictionary

6.2.2 Requirements

Table 3 lists the requirements for CD_FeatureConceptDictionary.

Table 3 — CD_FeatureConceptDictionary requirements

Requirement
19126FeatureConceptDictionary:CD_FeatureConceptDictionary
A CD_FeatureConceptDictionary is a subclass of RE_Register, specified in ISO 19135-1:2015, B.2.2, and shall inherit its properties.
Additionally, a CD_FeatureConceptDictionary shall have the following attributes and roles which are further described in 6.2.3:
— scope;
— fieldOfApplication;
— theme;
— containConcept.

6.2.3 Properties

6.2.3.1 General

CD_FeatureConceptDictionary is a subclass of RE_Register, specified in ISO 19135-1:2015, B.2.2. It has three attributes and one association in addition to the height attributes and six associations that it inherits from RE_Register ([Table 4](#)).

Table 4 — Elements inherited from RE_Register

Name	Type	Definition
name	attribute	designator that is used to uniquely denote the register within the set of registers maintained by the register owner
contentSummary	attribute	general statement of the purpose for which items in the register are made available
uniformResourceIdentifier	attribute	information about online resources associated with the register
operatingLanguage	attribute	language, country information and character encoding for the proper interpretation of the content of character strings in the register
alternativeLanguages	attribute	additional language used by items in the register
identifier	attribute	designator that is used to uniquely denote that register within the set of registers maintained by the register owner
version	attribute	specification of a unique state in the life of the register
dateOfLastChange	attribute	date of the most recent change to the status of an item in the register
manager	role	RE_RegisterStakeholder that manages the register
owner	role	RE_RegisterStakeholder that owns the register
submitter	role	RE_RegisterStakeholder that has submitted proposals for changes to the content of the register
citation	role	RE_ReferenceSource that describe the sources (documents or registers) from which items in the RE_Register have been taken
containedItem	role	RE_RegisterItem held in the register
containedItemClass	role	RE_ItemClass that describes the characteristics of a class of items held in the register

6.2.3.2 scope

The attribute *scope* is represented as a set of CD_Scope elements ([6.3](#)) that describe the subject domains of the concepts in the feature concept dictionary. The value of *scope* may be used as the basis for creating metadata for submission to search engines.

EXAMPLE 1 CD_Scope.name = "Hydrography",
CD_Scope.description = "Features that are or are related to artefacts involving bodies of water."

EXAMPLE 2 CD_Scope.name = "Ports and Harbours",
CD_Scope.description = "Features that are related to marine ports and harbours, including their associated anchorage, docking and related cultural facilities."

6.2.3.3 theme

The optional attribute *theme* uses a set of MD_Keywords (ISO 19115-1:2014, B.3.1) elements to describe aspects of the content of the feature concept dictionary not provided by the attribute *dictionaryScope*.

EXAMPLE MD_Keywords.keyword = "Atlantic Ocean"
MD_Keywords.type = "place."

6.2.3.4 fieldOfApplication

The optional attribute *fieldOfApplication* is represented as a set of RE_FieldOfApplication elements as per ISO 19135-1:2015, B.2.3.4, that describe the purposes for which items in the feature concept dictionary are used. The value of *fieldOfApplication* may be used as the basis for creating metadata for submission to search engines.

EXAMPLE 1 RE_FieldOfApplication.name = "Agricultural Production",
RE_FieldOfApplication.description = "Pertaining to the science, art and business of cultivating soil, producing crops and raising livestock."

EXAMPLE 2 RE_FieldOfApplication.name = "Marine Navigation"
RE_FieldOfApplication.description = "Pertaining to the science or art of conducting ships or vessels from one place to another at sea."

6.2.3.5 containedConcept

The role name *containedConcept* aggregates instances of CD_Concept through the Content association. This is a refinement of the Content association inherited from RE_Register.

6.3 CD_Scope

6.3.1 General

CD_Scope ([Figure 3](#)) describes an information domain represented by concepts in the feature concept dictionary.

6.3.2 Requirements

[Table 5](#) lists the requirements for CD_Scope.

Table 5 — CD_Scope requirements

Requirement
19126FeatureConceptDictionary:CD_Scope
A CD_Scope shall have the following attributes which are further described in 6.3.3 :
— name; and
— description.

6.3.3 Properties

6.3.3.1 General

The < <DataType> > class CD_Scope ([Figure 3](#)) contains two attributes.

6.3.3.2 name

The attribute *name* is represented as a CharacterString that identifies the information domain.

6.3.3.3 description

The optional attribute *description* is represented as a CharacterString that describes the information domain.

6.4 CD_Concept

6.4.1 General

The class `CD_Concept` (Figure 4) specifies the description of a concept in the feature concept dictionary. As a subclass of `RE_RegisterItem` (ISO 19135-1:2015, B.2.3.2), it and all of its subclasses inherit 13 attributes and nine associations (Table 3), notably including name and definition. It has two additional associations and four subclasses.

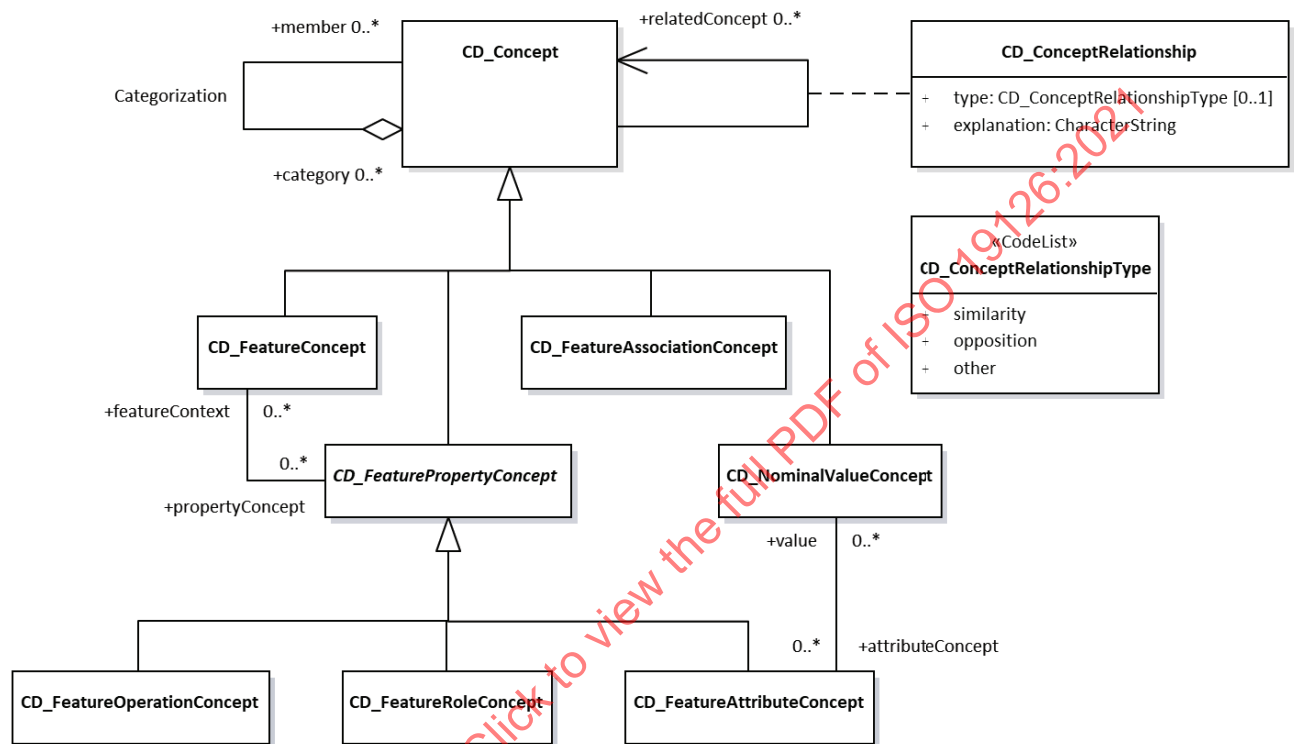


Figure 4 — `CD_Concept`

6.4.2 Requirements

Table 6 lists the requirements for `CD_Concept`.

Table 6 — `CD_Concept` requirements

Requirement
19126FeatureConceptDictionary:CD_Concept
A <code>CD_Concept</code> is a subclass of <code>RE_RegisterItem</code> , specified in ISO 19135 1:2015, B.2.3.2, and shall inherit its attributes and associations.
Additionally, a <code>CD_Concept</code> shall have the following roles which are further described in 6.4.3:
— category;
— member; and
— relatedConcept.

6.4.3 Properties

6.4.3.1 General

As a subclass of RE_RegisterItem (ISO 19135-1:2015, B.2.3.2), CD_Concept and all of its subclasses inherit 13 attributes and nine associations (Table 7), notably including name and definition. It has two additional associations and four subclasses.

Table 7 — Elements inherited from RE_RegisterItem

Name	Type	Definition
name	attribute	compact and human-readable designator that is used to denote a register concept
definition	attribute	precise statement of the nature, properties, scope, or essential qualities of the concept realized by the item
alternativeExpressions	attribute	instances of RE_AlternativeExpression each specifying an alternative name and optionally additional information about the item in a language other than the <i>operatingLanguage</i> of the register
dateAccepted	attribute	date on which a proposal to add the item to the register was accepted
dateAmended	attribute	date on which a proposal to supersede or retire the item was accepted
description	attribute	nature, properties, scope, or non-essential qualities of the concept realized by the item
fieldOfApplication	attribute	instance of RE_FieldOfApplication that describes a kind of use of the item
itemIdentifier	attribute	uniquely denote that item within an item class and is intended for information processing
status	attribute	identifies the registration status of the RE_RegisterItem
dateTimeAddition	attribute	date on which the item was added
dateTimeSuppression	attribute	date and time on which an item has been superseded
dateTimeRetirement	attribute	date and time on which an item has been retired
dateTimeInvalidation	attribute	date and time on which an item has been invalidated
additionInformation	role	instance of RE_AdditionInformation that contains information about the process of adding this RE_RegisterItem to the register
amendmentInformation	role	instance of RE_AmendmentInformation that contains information about the process of amending this RE_RegisterItem
clarificationInformation	role	instance of RE_ClarificationInformation that contains information about the process of clarifying this RE_RegisterItem
specificationLineage	role	instances of RE_Reference that provide information about the development of the item specification
specificationSource	role	instance of RE_Reference that identifies the source of the register item
predecessor	role	describes a previous concept of the register item
successor	role	describes a later concept of the register item
register	role	connects an instance of a register item class to a register
itemClass	role	connects an instance of a register item to an item class

6.4.3.2 category and member

As shown by the association *Categorization*, a concept may categorize many other *member* concepts. It may also be categorized by many other *category* concepts. In the first case, the conditional role name *category* identifies an instance of CD_Concept that categorizes other instances of CD_Concept. In the second case, the conditional role name *member* identifies an instance of CD_Concept that is categorized by the *category* concept.

EXAMPLE The concepts “buoy” and “VOR” can be categorized by the concept “aid to navigation”. The concept “buoy” can be also categorized by the concept “marker”.

6.4.3.3 relatedConcept

The role name *relatedConcept* identifies zero or more concepts that have some kind of relationship to this concept as described by the association class CD_Concept Relationship (6.5).

6.4.4 Subclasses

The classes CD_FeatureConcept (6.5), CD_FeaturePropertyConcept (6.8), CD_FeatureAssociationConcept (6.11) and CD_NominalValueConcept (6.10) are subclasses of CD_Concept that specify information about types of concepts in feature concept dictionaries.

6.5 CD_ConceptRelationship

6.5.1 General

The association class CD_ConceptRelationship may connect an instance of CD_Concept to a related instance of CD_Concept. This association cannot be used to describe a categorization (6.4.3.1) or a contextual relationship (6.8.3.2, 6.12.3.4). The association class has two attributes. This association is used to describe relationships between concepts as such. Relationships between features as such are described by instances of FC_FeatureAssociationConcept.

6.5.2 Requirements

Table 8 lists the requirements for CD_ConceptRelationship.

Table 8 — CD_ConceptRelationship requirements

Requirement
19126FeatureConceptDictionary:CD_ConceptRelationship
The association class CD_ConceptRelationship shall have the following two attributes which are further described in 6.5.3:
— type; and
— explanation.

6.5.3 Properties

6.5.3.1 General

CD_ConceptRelationship has two attributes.

6.5.3.2 type

The attribute *type* identifies the general nature of the relationship between concepts. It takes a value from the code list CD_ConceptRelationshipType.

6.5.3.3 explanation

The attribute *explanation* uses a CharacterString to provide an explanation of the specific relationship.

EXAMPLE The feature concept specified by the name “dome” is similar to the feature concept specified by the name “cupola”. The value of the attribute *type* would be “similarity” and the value of the attribute *explanation* could be “a dome has the same shape as a cupola but a dome is usually distinguished from a cupola by its larger size”.

6.6 CD_ConceptRelationshipType

6.6.1 General

The code list CD_ConceptRelationshipType contains a set of keywords that identify the general nature of the relationships between concepts.

6.6.2 Requirements

[Table 9](#) lists the requirements for CD_ConceptRelationshipType.

Table 9 — CD_ConceptRelationshipType requirements

Requirement
19126FeatureConceptDictionary:CD_ConceptRelationshipType
The code values for CD_ConceptRelationshipType shall include the following values which are further described in 6.6.2 :
— similarity;
— opposition; and
— other.

6.6.3 Code values

[Table 10](#) sets the code values for the codelist CD_ConceptRelationshipType.

Table 10 — CD_ConceptRelationshipType code values

Code value	Semantics
similarity	Relationship such that two concepts share many significant characteristics but differ in other, generally less significant, characteristics.
opposition	Relationship such that the connotation of one concept is contrary to that of the other.
other	Relation of a type not otherwise identified by a keyword in the code list

6.7 CD_FeatureConcept

6.7.1 General

The class CD_FeatureConcept ([Figure 5](#)) specifies the description of a feature concept. In addition to the properties it inherits from RE_RegisterItem and CD_Concept ([6.4](#)), it has one additional association.

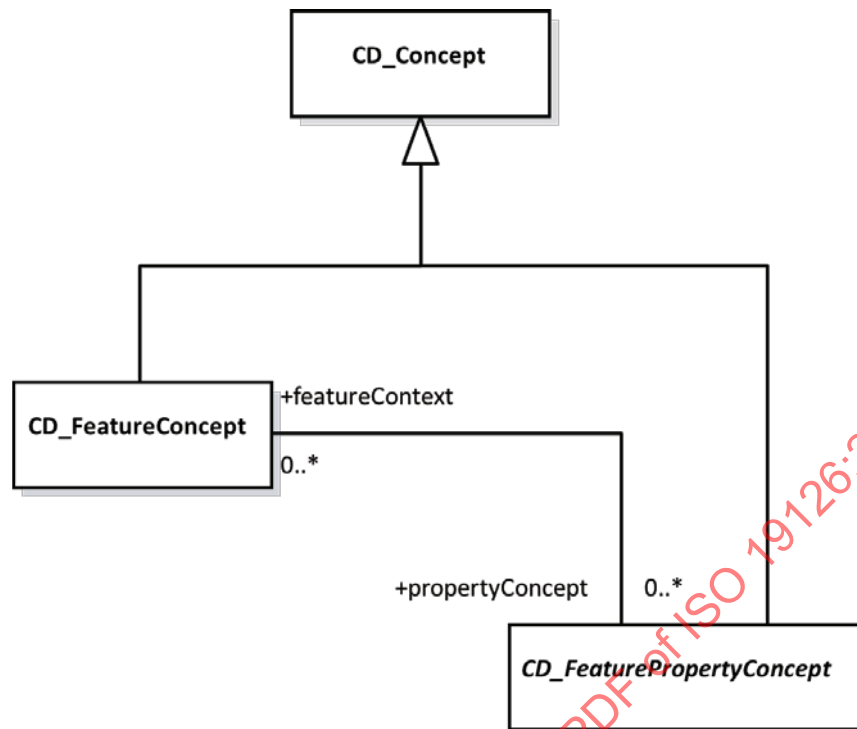


Figure 5 — CD_FeatureConcept

6.7.2 Requirements

Table 11 lists the requirements for CD_FeatureConcept.

Table 11 — CD_FeatureConcept requirements

Requirement
19126FeatureConceptDictionary:CD_FeatureConcept
A CD_FeatureConcept is a subclass of CD_Concept and shall inherit attributes and associations from RE_RegisterItem and CD_Concept.
Additionally, a CD_FeatureConcept shall have the following role which is further described in 6.7.3: — <i>propertyConcept</i> .

6.7.3 Properties

6.7.3.1 General

CD_FeatureConcept has one role.

6.7.3.2 *propertyConcept*

The role name *propertyConcept* identifies zero or more instances of CD_FeaturePropertyConcept (6.8) that can be relevant within the context of the CD_FeatureConcept.

EXAMPLE A feature concept of “building” can have property concepts such as the attribute concepts “floor count” or “roof type” or the role concept “manager”.

6.8 CD_FeaturePropertyConcept

6.8.1 General

The abstract class `CD_FeaturePropertyConcept` is a subclass of `CD_Concept` (Figure 4) that specifies the description of a feature property concept. In addition to the properties that it inherits from `CD_Concept`, it has one association (Figure 5) and three subclasses.

6.8.2 Requirements

Table 12 lists the requirements for `CD_FeaturePropertyConcept`.

Table 12 — `CD_FeaturePropertyConcept` requirements

Requirement
19126FeatureConceptDictionary:CD_FeaturePropertyConcept
A <code>CD_FeaturePropertyConcept</code> is a subclass of <code>CD_Concept</code> and shall inherit its attributes and associations. Additionally, a <code>CD_FeaturePropertyConcept</code> shall have the following role which is further described in 6.8.3: — <code>featureContext</code> .

6.8.3 Properties

6.8.3.1 General

`CD_FeaturePropertyConcept` has one role.

6.8.3.2 `featureContext`

The role name *featureContext* may identify zero or more instances of `CD_FeatureConcept` for which the `CD_FeaturePropertyConcept` is relevant.

EXAMPLE A feature attribute concept of “water depth” is only meaningful when assigned to feature concepts regarding phenomena normally containing water, such as “lake”, “river” or “swimming pool”.

6.8.4 Subclasses

The classes `CD_FeatureAttributeConcept` (6.9), `CD_FeatureRoleConcept` (6.12) and `CD_FeatureOperationConcept` (6.13) are subclasses of `CD_FeaturePropertyConcept` that specify information about types of feature property concepts in feature concept dictionaries.

6.9 CD_FeatureAttributeConcept

6.9.1 General

The class `CD_FeatureAttributeConcept` (Figure 6) specifies the description of a feature attribute concept in the feature concept dictionary. In addition to the properties it inherits from `CD_FeaturePropertyConcept`, it has two attributes and one association.

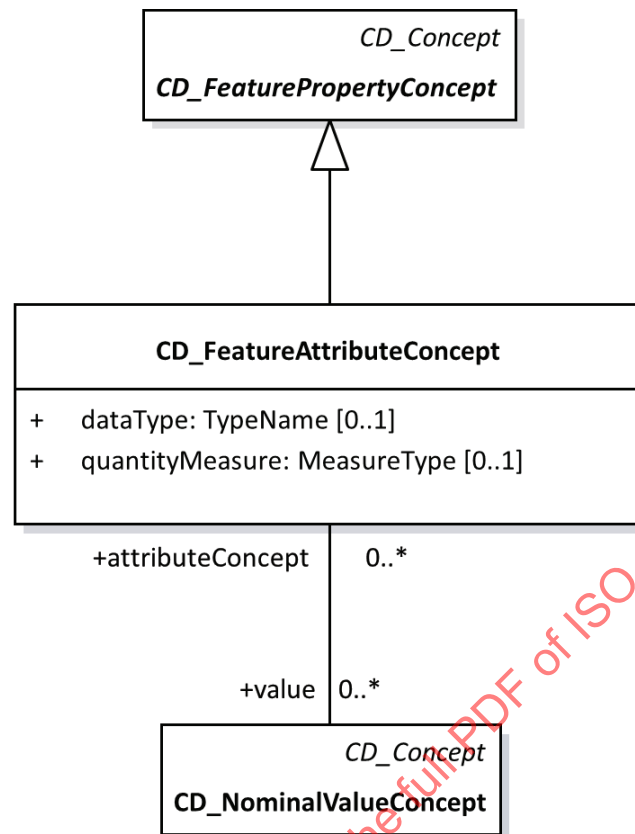


Figure 6 — CD_FeatureAttributeConcept

6.9.2 Requirements

[Table 13](#) lists the requirements for CD_FeatureAttributeConcept.

Table 13 — CD_FeatureAttributeConcept requirements

Requirement
19126FeatureConceptDictionary:CD_FeatureAttributeConcept
A CD_FeatureAttributeConcept is a subclass of CD_FeaturePropertyConcept and shall inherit its attributes and associations.
Additionally, a CD_FeatureAttributeConcept shall have the following attributes and roles which are further described in 6.5.3 :
— dataType;
— quantityMeasure; and
— value.

6.9.3 Properties

6.9.3.1 General

In addition to the properties it inherits from CD_FeaturePropertyConcept, CD_FeatureAttributeConcept has two attributes and one role.

6.9.3.2 dataType

The attribute *dataType* is represented as a TypeName as per ISO 19103:2015, 7.5.6, that specifies the allowed data type of the feature attribute concept.

EXAMPLE “Number”, “CharacterString” or “Boolean”.

NOTE A TypeName is a LocalName that references either a recordType or an object type in some form of schema.

6.9.3.3 quantityMeasure

The conditional attribute *quantityMeasure* is represented as an instance of Measure (ISO 19103:2015, C.4.2) that specifies the quantity type of the feature attribute concept quantity. The *quantityMeasure* is specified when the value of the feature attribute concept is the measure of a quantity.

6.9.3.4 value

The *dataType* of an instance of CD_FeatureAttributeConcept may be either an <<Enumeration>> or a <<Codelist>>. If that is the case, the conditional role name *value* identifies one or more instances of CD_NominalValueConcept (6.10) that may be included in the enumeration or code list. Otherwise, the minimum multiplicity of zero applies.

6.10 CD_NominalValueConcept

6.10.1 General

The class CD_NominalValueConcept (Figure 7) specifies a category, class, kind, or type that may be identified as an element of an enumeration or code list that is to be used as the data type of a feature attribute concept.

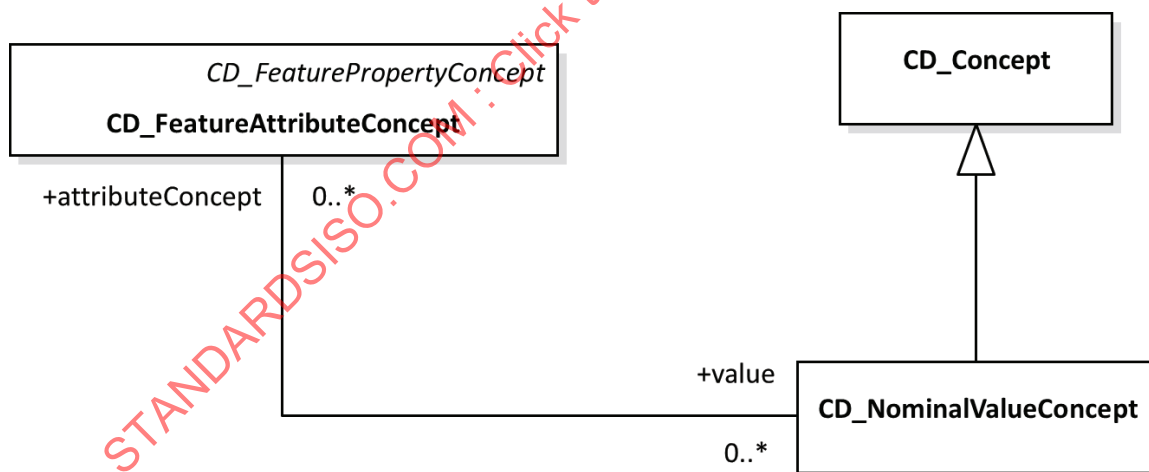


Figure 7 — CD_NominalValueConcept

6.10.2 Requirements

Table 14 lists the requirements for CD_NominalValueConcept.

Table 14 — CD_NominalValueConcept requirements

Requirement
19126FeatureConceptDictionary:CD_NominalValueConcept
A CD_NominalValueConcept is a subclass of CD_Concept and shall inherit its attributes and associations. Additionally, a CD_NominalValueConcept shall have the following role which is further described in 6.10.3 : — attributeConcept.

6.10.3 Properties

6.10.3.1 General

In addition to the properties it inherits from CD_Concept ([6.4](#)), CD_NominalValueConcept has one role.

6.10.3.2 attributeConcept

The role name *attributeConcept* identifies one or more instances of CD_FeatureAttributeConcept ([6.9](#)) for which this instance of CD_NominalValueConcept may serve as an element of an enumeration or code list *dataType*.

6.11 CD_FeatureAssociationConcept

6.11.1 General

The class CD_FeatureAssociationConcept ([Figure 8](#)) specifies the description of a feature association concept. It has one association in addition to the properties it inherits from CD_Concept ([6.4](#)).

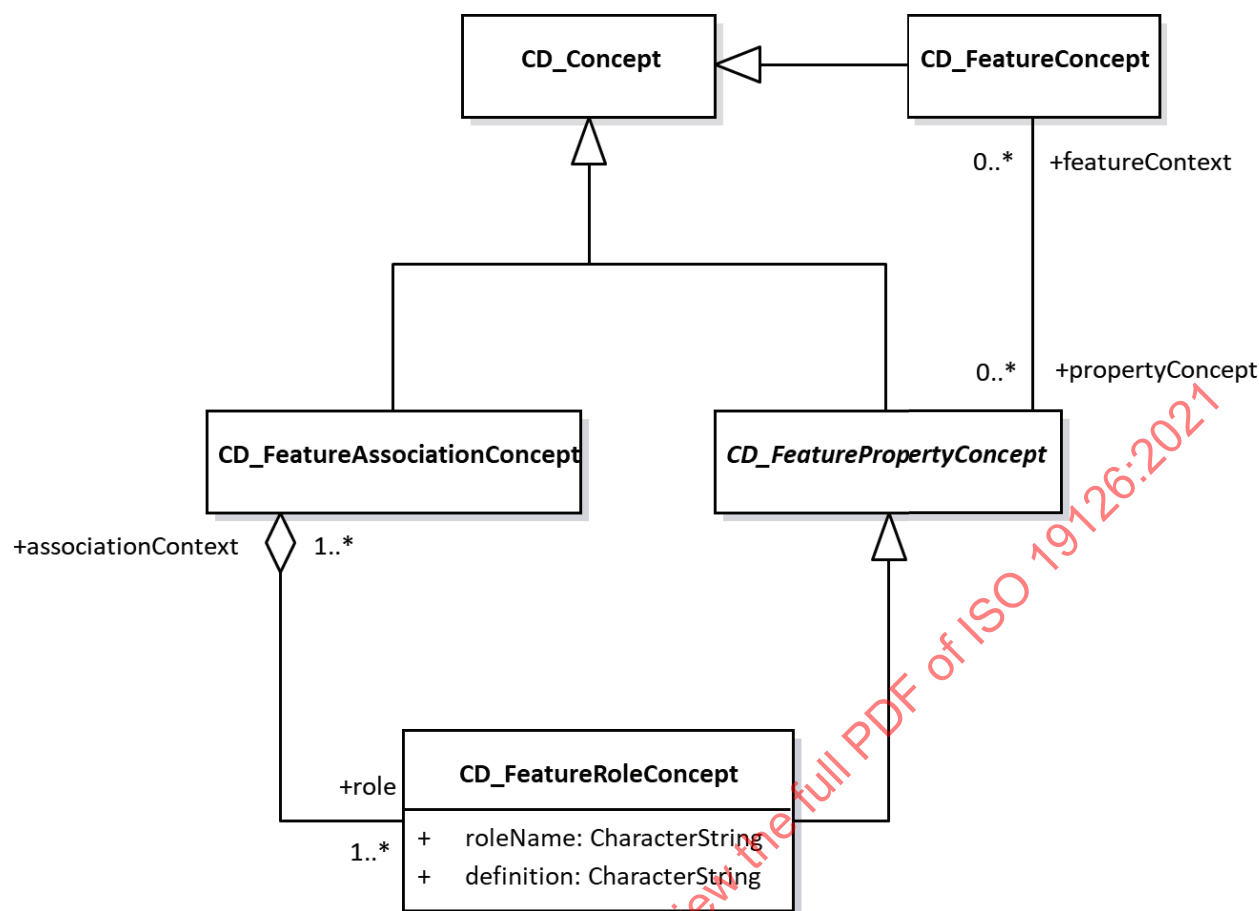


Figure 8 — CD_FeatureAssociationConcept and CD_FeatureRoleConcept

6.11.2 Requirements

Table 15 lists the requirements for CD_FeatureAssociationConcept.

Table 15 — CD_FeatureAssociationConcept requirements

Requirement
19126FeatureConceptDictionary:CD_FeatureAssociationConcept
A CD_FeatureAssociationConcept is a subclass of CD_Concept and shall inherit its attributes and associations. Additionally, a CD_FeatureAssociationConcept shall have the following role which is further described in 6.11.3:
— role.

6.11.3 Properties

6.11.3.1 General

In addition to the properties it inherits from CD_Concept (6.4), CD_FeatureAssociationConcept has one role.

6.11.3.2 Role

The role name *role* identifies one or more instances of CD_FeatureRoleConcept (6.12), each of which identifies a *role* that an instance of a feature concept may serve in an instance of CD_

FeatureAssociationConcept. As a subclass of CD_FeaturePropertyConcept, an instance of CD_FeatureRoleConcept may be assigned to a CD_FeatureConcept that acts in the named role.

EXAMPLE A “supports” feature association concept describes a relationship between two real world phenomena. The association involves two roles. One, “supported-by”, could be assigned to a road, a railroad or a canal, for example, and the other, “supporter-of” could be assigned to a bridge, a culvert or a causeway.

6.12 CD_FeatureRoleConcept

6.12.1 General

The class CD_FeatureRoleConcept ([Figure 8](#)) describes a feature role concept.

6.12.2 Requirements

[Table 16](#) lists the requirements for CD_FeatureRoleConcept.

Table 16 — CD_FeatureRoleConcept requirements

Requirement
19126FeatureConceptDictionary:CD_FeatureRoleConcept
A CD_FeatureRoleConcept is a subclass of CD_FeaturePropertyConcept and shall inherit its attributes and associations. Additionally, a CD_FeatureRoleConcept shall have the following attributes and roles which are further described in 6.12.3: — roleName; — definition; and — associationContext.

6.12.3 Properties

6.12.3.1 General

In addition to the properties it inherits from CD_FeaturePropertyConcept ([6.8](#)), CD_FeatureRoleConcept has two attributes and one role.

6.12.3.2 roleName

The attribute *roleName* is represented as a CharacterString that identifies the role played by an instance of a feature type in an instance of the feature association concept to which the role concept belongs.

6.12.3.3 definition

The attribute *definition* is represented as a CharacterString that specifies the role played by an instance of a feature type in the feature association concept to which the role concept belongs.

6.12.3.4 associationContext

The role name *associationContext* identifies an instance of CD_FeatureAssociationConcept ([6.11](#)) that identifies the *association* in which a feature role concept serves.

6.13 CD_FeatureOperationConcept

6.13.1 General

The class CD_FeatureOperationConcept (Figure 9) specifies the description of a feature operation concept.

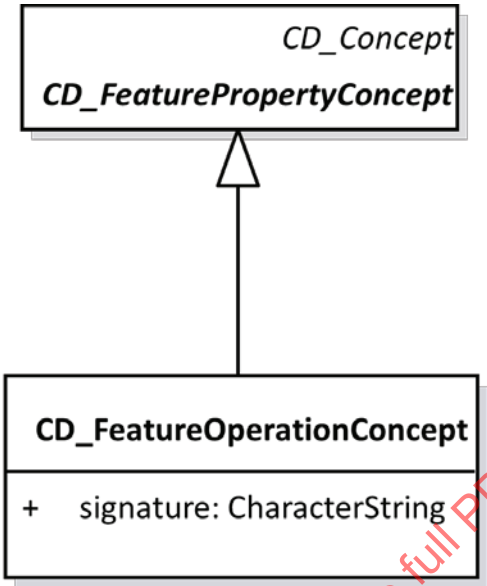


Figure 9 — CD_FeatureOperationConcept

6.13.2 Requirements

Table 17 lists the requirements for CD_FeatureOperationConcept.

Table 17 — CD_FeatureOperationConcept requirements

Requirement
19126FeatureConceptDictionaryCD_FeatureOperationConcept
A CD_FeatureOperationConcept is a subclass of CD_Concept and shall inherit its attributes and associations. Additionally, a CD_FeatureOperationConcept shall have the following attribute which is further described in 6.13.3:
— signature.

6.13.3 Properties

6.13.3.1 General

In addition to the properties it inherits from CD_FeaturePropertyConcept (6.8), CD_FeatureOperationConcept has one attribute.

6.13.3.2 signature

The attribute *signature* is represented by a CharacterString containing the name and parameters for the feature operation.

7 Management of feature concept dictionaries as registers

7.1 General

ISO 19135-1 specifies procedures for managing a register of items of geographic information, as well as a set of content elements common to all such registers. As shown in [Table 4](#), these include a number of elements of management information. A feature concept dictionary is an instance of RE_Register (ISO 19135-1). According to ISO 19135-1, all of the registered items contained in a register belong to item classes, each of which is described by an instance of RE_ItemClass. This clause specifies five instances of RE_ItemClass that describe each of the five kinds of concepts listed in [6.1](#) and shown in [Figure 3](#).

The requirements for the management of feature concept dictionaries as registers has one requirement class, identified as <https://standards.iso211.org/iso19126/-/2/req/FeatureConceptDictionaryManagement/> (i.e. 19126FeatureConceptDictionaryManagement) and are listed in [Table 18](#).

Table 18 — Requirements class for the management of feature concept dictionaries as registers

Requirements class	
19126FeatureConceptDictionaryManagement = https://standards.iso211.org/iso19126/-/2/req/FeatureConceptDictionaryManagement/	
Target type	Management
Dependency	https://standards.iso.org/iso/19103/ed-2/en/ (Conceptual schema language)
Dependency	https://standards.iso.org/iso/19135/-/ed-2/en/ (Procedures for item registration – Fundamentals)
Requirement	19126FeatureConceptDictionaryManagement:FeatureConceptIC
Requirement	19126FeatureConceptDictionaryManagement:FeatureAttributeConceptIC
Requirement	19126FeatureConceptDictionaryManagement:NominalValueConceptIC
Requirement	19126FeatureConceptDictionaryManagement:FeatureAssociationConceptIC
Requirement	19126FeatureConceptDictionaryManagement:FeatureOperationConceptIC

7.2 Item class for feature concepts

Table 19 — Feature concept item class requirements

Requirement
19126FeatureConceptDictionaryManagement:FeatureConceptIC
The item class for feature concepts shall be an instance of RE_ItemClass (ISO 19135 1:2015, B.2.4) that shall be assigned the following attribute values.
The value of the attribute name:CharacterString shall be “Feature Concept”.
The value of the attribute technicalStandard:CI_Citation shall be:
a) title:CharacterString = “ISO 19126, Geographic information – Feature concept dictionaries and registers”;
b) alternateTitle:CharacterString = “ISO 19126”;
c) date:CI_Date:
1) date:Date = 2021;
2) dateType:CI_DateTypeCode = “revision”.

7.3 Item class for feature attribute concepts

Table 20 — Feature Attribute concept item class requirements

Requirement
19126FeatureConceptDictionaryManagement:FeatureAttributeConceptIC
The item class for feature concepts shall be an instance of RE_ItemClass (ISO 19135 1:2015, B.2.4) that shall be assigned the following attribute values.
The item class for feature attribute concepts shall be an instance of RE_ItemClass (ISO 19135-1:2015, B.2.4) that shall be assigned the following attribute values.
The value of the attribute <i>name:CharacterString</i> shall be "Feature Attribute Concept".
The value of the attribute <i>technicalStandard:CI_Citation</i> shall be:
a) title:CharacterString = "ISO 19126, Geographic information – Feature concept dictionaries and registers";
b) alternateTitle:CharacterString = "ISO 19126";
c) date:CI_Date:
1) date:Date = 2021;
2) dateType:CI_DateTypeCode = "revision".

7.4 Item class for nominal value concepts

Table 21 — Nominal value concept item class requirements

Requirement
19126FeatureConceptDictionaryManagement:NominalValueConceptIC
The item class for nominal value concepts shall be an instance of RE_ItemClass (ISO 19135-1:2015, B.2.4) that shall be assigned the following attribute values.
The value of the attribute <i>name:CharacterString</i> shall be "Nominal Value Concept".
The value of the attribute <i>technicalStandard:CI_Citation</i> shall be:
a) title:CharacterString = "ISO 19126, Geographic information – Feature concept dictionaries and registers";
b) alternateTitle:CharacterString = "ISO 19126";
c) date:CI_Date:
1) date:Date = 2021;
2) dateType:CI_DateTypeCode = "revision".

7.5 Item class for feature association concepts

Table 22 — Feature association concept item class requirements

Requirement
19126FeatureConceptDictionaryManagement:FeatureAssociationConceptIC
The item class for feature association concepts shall be an instance of RE_ItemClass (ISO 19135-1:2015, B.2.4) that shall be assigned the following attribute values.
The value of the attribute <i>name:CharacterString</i> shall be “Feature Association Concept”.
The value of the attribute <i>technicalStandard:CI_Citation</i> shall be:
a) title:CharacterString = “ISO 19126, Geographic information – Feature concept dictionaries and registers”;
b) alternateTitle:CharacterString = “ISO 19126”;
c) date:CI_Date:
1) date:Date = 2021;
2) dateType:CI_DateTypeCode = “revision”.

7.6 Item class for feature operation concepts

Table 23 — Feature operation concept item class requirements

Requirement
19126FeatureConceptDictionaryManagement:FeatureOperationConceptIC
The item class for feature operation concepts shall be an instance of RE_ItemClass (ISO 19135-1:2015, B.2.4) that shall be assigned the following attribute values.
The value of the attribute <i>name:CharacterString</i> shall be “Feature Operation Concept”.
The value of the attribute <i>technicalStandard:CI_Citation</i> shall be:
a) title:CharacterString = “ISO 19126, Geographic information – Feature concept dictionaries and registers”;
b) alternateTitle:CharacterString = “ISO 19126”;
c) date:CI_Date:
1) date:Date = 2021;
2) dateType:CI_DateTypeCode = “revision”.

8 Register of feature concept dictionaries and feature catalogues

8.1 General

A set of feature concept dictionaries and/or feature catalogues may be managed as a hierarchical register (ISO 19135-1:2015, Clause 8). Feature catalogues that are derived from feature concept dictionaries should be managed as part of the hierarchical register that contains the source feature concept dictionary.

The principal register of a hierarchical register contains instances of RE_SubregisterDescription, each of which describes one of the subregisters. The Hierarchical Register package specified in this document contains a subclass of RE_SubregisterDescription that adds attributes pertinent to feature concept dictionaries (8.2).

As an instance of RE_Register, the principal register also has a mandatory association to a set of instances of RE_ItemClass, each of which describes one class of items held in the register. This document specifies the instance of RE_ItemClass that describes feature concept dictionary registers (8.4).

The requirements for the management of feature concept dictionaries as registers has one requirement class, identified as <https://standards.iso211.org/iso19126/-/2/req/FeatureInformationSubregister/> (i.e. 19126FeatureInformationSubregister) and are listed in [Table 24](#).

Table 24 — Requirements class for the management of feature concept dictionaries as registers

Requirements class	
19126FeatureInformationSubregister = https://standards.iso211.org/iso19126/-/2/req/FeatureInformationSubregister/	
Target type	Management
Dependency	https://standards.iso.org/iso/19103/ed-2/en/ (Conceptual schema language)
Dependency	https://standards.iso.org/iso/19135/-/ed-2/en/ (Procedures for item registration – Fundamentals)
Requirement	19126FeatureInformationSubregister:HR_FeatureInformationSubregisterDescription
Requirement	19126FeatureInformationSubregister:HR_FeatureInfoSubRegisterType
Requirement	19126FeatureInformationSubregister:FeatureConceptDictionaryIC
Requirement	19126FeatureInformationSubregister:FeatureDataCatalogueIC

8.2 HR_FeatureInformationSubregisterDescription

8.2.1 General

The class HR_FeatureInformationSubregisterDescription ([Figure 10](#)) is derived from the class RE_SubregisterDescription (ISO 19135-1:2015, B.2.8) and specify information about a feature information subregister.

Instances of HR_FeatureInformationSubregisterDescription are populated only with information identifying and describing feature concept dictionary registers or feature catalogue registers.

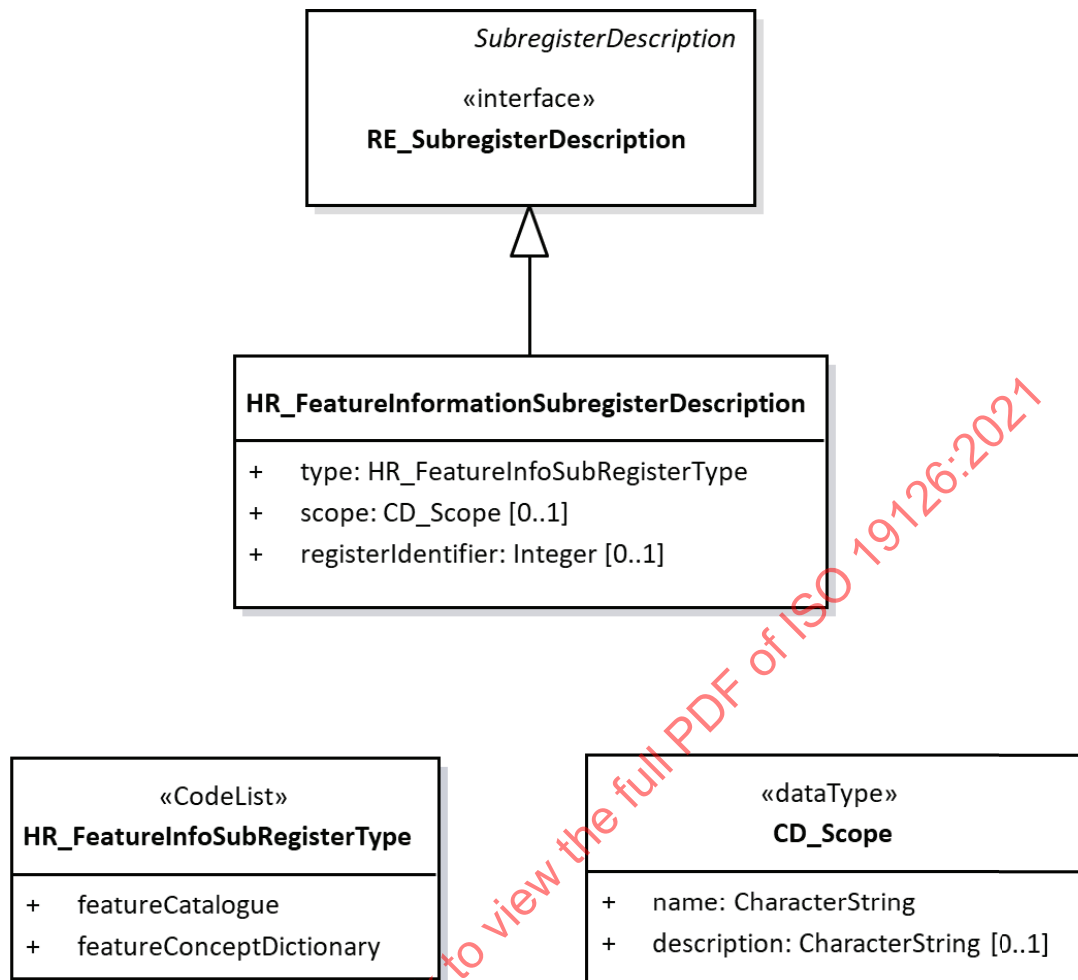


Figure 10 — HR_FeatureInformationSubregisterDescription

8.2.2 Requirements

Table 25 lists the requirements for HR_FeatureInformationSubregisterDescription.

Table 25 — HR_FeatureInformationSubregisterDescription requirements

Requirement
19126FeatureInformationSubregister:HR_FeatureInformationSubregisterDescription
A HR_FeatureInformationSubregisterDescription is a subclass of RE_SubregisterDescription (ISO 19135 1:2015, B.2.8) and shall inherit its attributes and associations.
Additionally, a HR_FeatureInformationSubregisterDescription shall have the following attributes which are further described in 8.2.3:
— type;
— scope; and
— registerIdentifier.

8.2.3 Properties

8.2.3.1 General

In addition to the properties it inherits from RE_SubregisterDescription (ISO 19135 1:2015, B.2.8), HR_FeatureInformationSubregisterDescription has three attributes.

8.2.3.2 type

The attribute *type* contains an instance of HR_FeatureInfoSubregisterType that indicates whether the feature information subregister is a feature concept dictionary or a feature catalogue.

8.2.3.3 scope

The optional attribute *scope* is represented as a set of CD_Scope elements (6.3) that describe subject domains of the referenced feature concept dictionary or feature catalogue.

The value of the attribute *scope* is identical to that of the *CD_FeatureConceptDictionary.scope* of the referenced feature concept dictionary or the *FC_FeatureCatalogue.scope* (ISO 19110) of the referenced feature catalogue.

8.2.3.4 registerIdentifier

The conditional attribute *registerIdentifier* is represented as a positive integer that is used to uniquely denote the feature information subregister within the scope of the principal register within which that subregister resides.

NOTE The *registerIdentifier* allows information processing activities to distinguish individual subregisters that together comprise a compound registry (5.3.3). It can be used in conjunction with the value of *uniformResourceIdentifier* to electronically access the resource described by the subregister.

8.2.4 Constraints on inherited attributes and associations

The class HR_FeatureInformationSubregisterDescription inherits height attributes and six association roles from the class RE_SubregisterDescription (ISO 19135-1:2015, B.2.8). For those attributes and association roles not related to item management, Table 4 specifies the intended use in populating instances of HR_FeatureInformationSubregisterDescription.

Table 26 — HR_FeatureInformationSubregisterDescription inherited attributes and roles

Name	Type	Definition
operatingLanguage	attribute	identical to the RE_Register.operatingLanguage of the referenced feature concept dictionary register or feature catalogue register
uniformResourceIdentifier	attribute	specifies a resource providing access to the complete content of the feature concept dictionary register or feature catalogue register; generally the same as the RE_Register.uniformResourceIdentifier of the referenced feature concept dictionary register or feature catalogue register
itemIdentifier	attribute	uniquely denote that item within an item class and is intended for information processing
status	attribute	identifies the registration status of the RE_RegisterItem
dateTimeAddition	attribute	date on which the item was added
dateTimeSuppression	attribute	date and time on which an item has been superseded
dateTimeRetirement	attribute	date and time on which an item has been retired
dateTimeInvalidation	attribute	date and time on which an item has been invalidated
subregisterManager	role	identical to the RE_Register.manager of the referenced feature concept dictionary register or feature catalogue register

Table 26 (continued)

Name	Type	Definition
itemClass	role	either of the instances of RE_ItemClass specified in 8.3
containedItemClass	role	one or more subclasses of the allowed item classes of a feature concept dictionary register or feature catalogue register
predecessor	role	describes a previous concept of the register item
successor	role	describes a later concept of the register item
register	role	connects an instance of a register item class to a register

8.3 HR_FeatureInfoSubRegisterType

The code list HR_FeatureInfoSubRegisterType contains a set of keywords that identify the nature of the feature information subregister.

8.3.1 Requirements

Table 26 lists the requirements for HR_FeatureInfoSubRegisterType.

Table 27 — HR_FeatureInfoSubRegisterType requirements

Requirement
19126FeatureInformationSubregister:HR_FeatureInfoSubRegisterType
The code values for HR_FeatureInfoSubRegisterType shall include the following values which are further described in 8.3.2:
— featureCatalogue; and
— featureConceptDictionary.

8.3.2 Code values

Table 27 sets the code values for the codelist HR_FeatureInfoSubRegisterType.

Table 28 — HR_FeatureInfoSubRegisterType code values

Code value	Semantics
featureCatalogue	Feature information subregister is a feature catalogue.
featureConceptDictionary	Feature information subregister is a feature concept dictionary.

8.4 Item classes for feature information subregisters

8.4.1 General

This document specifies two instances of RE_ItemClass that describe subregisters for feature concept dictionaries and for feature catalogues.

8.4.2 Item class for feature concept dictionaries

Table 29 — Feature concept dictionaries item class requirements

Requirement
19126FeatureInformationSubregister:FeatureConceptDictionaryIC
The item class for feature concept dictionaries managed as subregisters shall be an instance of RE_ItemClass (ISO 19135-1:2015, B.2.4.2) that shall be assigned the following attribute values.
The value of the attribute <i>name:CharacterString</i> shall be “Feature Concept Dictionaries and Registers”.
The value of the attribute <i>technicalStandard:CI_Citation</i> shall be:
a) <i>title:CharacterString</i> = “ISO 19126, Geographic information – Feature concept dictionaries and registers”;
b) <i>alternateTitle:CharacterString</i> = “ISO 19126”;
c) <i>date:CI_Date</i> :
1) <i>date:Date</i> = 2021;
2) <i>dateType:CI_DateTypeCode</i> = “publication”.

8.4.3 Item class for feature data catalogues

Table 30 — Feature data catalogues item class requirements

Requirement
19126FeatureInformationSubregister:FeatureDataCatalogueIC
The item class for feature data catalogues managed as subregisters shall be an instance of RE_ItemClass (ISO 19135-1:2015, B.2.4.2) that shall be assigned the following attribute values.
The value of the attribute <i>name:CharacterString</i> shall be “Feature Catalogue Register”.
The value of the attribute <i>technicalStandard:CI_Citation</i> shall be:
a) <i>title:CharacterString</i> = “ISO 19110, Geographic information – Methodology for feature cataloguing”;
b) <i>alternateTitle:CharacterString</i> = “ISO 19110”;
c) <i>date:CI_Date</i> :
1) <i>date:Date</i> = 2016;
2) <i>dateType:CI_DateTypeCode</i> = “publication”.

Annex A (normative)

Abstract test suite

A.1 General

This annex presents the abstract test suite for evaluating conformance to this document. The abstract test suite contains a conformance class for feature concept dictionaries ([B.2](#)) and a conformance class for registers of feature concept dictionary registers and/or feature catalogue registers ([B.3](#)):

- 19126FeatureConceptDictionary-conf = <https://standards.iso211.org/iso19126/-/2/conf/featureConceptDictionary/>
- 19126register-conf = <https://standards.iso211.org/iso19126/-/2/conf/register/>

The conformance class for feature concept dictionaries (19126featureConceptDictionary-conf) includes the following tests:

- Feature concept dictionary (see [A.2.1](#))
- Scope (see [A.2.2](#))
- Concept (see [A.2.3](#))
- Concept relationship (see [A.2.4](#))
- Concept relationship type (see [A.2.5](#))
- Feature concept (see [A.2.6](#))
- Feature property concept (see [A.2.7](#))
- Feature attribute concept (see [A.2.8](#))
- Nominal value concept (see [A.2.9](#))
- Feature association concept (see [A.2.10](#))
- Feature role concept (see [A.2.11](#))
- Feature operation concept (see [A.2.12](#))

The conformance class for registers of feature concept dictionary registers and/or feature catalogue registers (19126register-conf) includes the following tests:

- Item class for feature concepts (see [A.3.1](#))
- Item class for feature attribute concepts (see [A.3.2](#))
- Item class for nominal value concepts (see [A.3.3](#))
- Item class for feature association concepts (see [A.3.4](#))
- Item class for feature operation concepts (see [A.3.5](#))
- Feature subregister (see [A.3.6](#))
- Feature subregister type (see [A.3.7](#))

- Item class for feature concept dictionaries (see [A.3.8](#))
- Item class for feature data catalogues (see [A.3.9](#))

A.2 Feature concept dictionary

A.2.1 Test for feature concept dictionary

The test 19126featureConceptDictionary-conf:CD_FeatureConceptDictionary for "feature concept dictionary" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies information about the feature concept dictionary itself. Verify that the class has all the properties of the class RE_Register, specified in ISO 19135-1:2015, B.2.2, and includes the attributes scope, fieldOfApplication, and theme, and the association role containConcept in conformance with [Table 3](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_FeatureConceptDictionary. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_FeatureConceptDictionary ([6.2.2](#))
- d) Test type: Capability test.

A.2.2 Test for scope

The test 19126featureConceptDictionary-conf:CD_Scope for "scope" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that describes an information domain represented by concepts in the feature concept dictionary. Verify that the class includes the attributes name, and description in conformance with [Table 5](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_Scope. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_Scope ([6.3.2](#)).
- d) Test type: Capability test.

A.2.3 Test for concept

The test 19126featureConceptDictionary-conf:CD_Concept for "concept" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies the description of a concept in the feature concept dictionary. Verify that the class has all the properties of the class RE_RegisterItem, specified in ISO 19135-1:2015, B.2.3.2, and includes the attributes category, and member, and the association role relatedConcept in conformance with [Table 6](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_Concept. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_Scope ([6.4.2](#)).
- d) Test type: Capability test.

A.2.4 Test for concept relationship

The test 19126featureConceptDictionary-conf:CD_ConceptRelationship for "concept relationship" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that may connect an instance of CD_Concept to a related instance of CD_Concept in the feature concept dictionary. Verify that the class includes the attributes type, and explanation in conformance with [Table 8](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_ConceptRelationship. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_ConceptRelationship ([6.5.2](#)).
- d) Test type: Capability test.

A.2.5 Test for concept relationship type

The test 19126featureConceptDictionary-conf:CD_ConceptRelationshipType for "concept relationship type" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a codelist of the concept relationship type compliant with [Table 9](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) that set the lists of values for the type of concept relationship.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_ConceptRelationship ([6.6.1](#)).
- d) Test type: Capability test.

A.2.6 Test for feature concept

The test 19126featureConceptDictionary-conf:CD_FeatureConcept for "feature concept" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies the description of a feature concept in the feature concept dictionary. Verify that the class has all the properties of the class CD_Concept ([6.4.2](#)) and includes the association role propertyConcept in conformance with [Table 11](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_FeatureConcept. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_ConceptRelationship ([6.7.2](#)).
- d) Test type: Capability test.

A.2.7 Test for feature property concept

The test 19126featureConceptDictionary-conf:CD_FeaturePropertyConcept for "feature property concept" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies the description of a feature property concept in the feature concept dictionary. Verify that the class has all the properties of the class CD_Concept ([6.4.2](#)) and includes the association role featureContext in conformance with [Table 12](#).

- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_FeaturePropertyConcept. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_FeaturePropertyConcept ([6.8.2](#)).
- d) Test type: Capability test.

A.2.8 Test for feature attribute concept

The test 19126featureConceptDictionary-conf:CD_FeatureAttributeConcept for "feature attribute concept" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies the description of a feature attribute concept in the feature concept dictionary. Verify that the class has all the properties of the class CD_FeaturePropertyConcept ([6.8.2](#)) and includes the attributes dataType, and quantityMeasure, and the association role value in conformance with [Table 13](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_FeatureAttributeConcept. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_Attribute ([6.9.2](#)).
- d) Test type: Capability test.

A.2.9 Test for nominal value concept

The test 19126featureConceptDictionary-conf:CD_NominalValueConcept for "nominal value concept" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies a category, class, kind, or type that may be identified as an element of an enumeration or code list that is to be used as the data type of a feature attribute concept in the feature concept dictionary. Verify that the class has all the properties of the class CD_Concept ([6.4.2](#)) and includes the association role attributeConcept in conformance with [Table 14](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_NominalValueConcept. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_NominalValueConcept ([6.10.2](#)).
- d) Test type: Capability test.

A.2.10 Test for feature association concept

The test 19126featureConceptDictionary-conf:CD_FeatureAssociationConcept for "feature association concept" is as follows:

- a) Test Purpose: Verify that the implementation of a feature concept dictionary contains a class that specifies the description of a feature association concept in the feature concept dictionary. Verify that the class has all the properties of the class CD_Concept ([6.4.2](#)) and includes the association role role in conformance with [Table 15](#).
- b) Test Method: Inspect the implementation of the feature concept dictionary and more specifically the container (e.g. structure, class, etc.) corresponding to CD_FeatureAssociationConcept. Inspect if the properties are set appropriately.
- c) Reference: Requirement 19126FeatureConceptDictionary:CD_FeatureAssociationConcept ([6.11.2](#)).