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Geographic information — Feature concept dictionaries and registers

Information géographique — Dictionnaires de concepts de caractéristiques 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 19126 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

Introduction

This International Standard specifies a schema for geographic feature concept dictionaries managed as registers. As described in ISO 19101, 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 may 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 specifies procedures for the registration of items of geographic information. Items of geographic information that may be registered are members of object classes specified in technical standards such as those developed by ISO/TC 211. This International Standard defines object classes and specifies rules used to establish and maintain feature concept dictionaries as ISO 19135 conformant register schemas.

ISO 19135 specifies the structure of a hierarchical register in which the principal register holds a set of items that describe the subregisters. This International Standard specifies a schema for a hierarchical register where the subregisters are feature concept dictionaries and/or feature catalogues. This International Standard specifies an accompanying schema. The resulting hierarchical register may 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 may 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 may be difficult in cases where the structure of registers differs between information communities. This International Standard may serve as a guide for different information communities to develop compatible registers that can support a system of geographic information cross-referencing.

The Digital Geographic Information Working Group (DGIWG) community feature concept dictionary and register is described as an example implementation of this International Standard.

Geographic information — Feature concept dictionaries and registers

1 Scope

This International Standard 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, because feature catalogue are often derived from feature concept dictionaries, this International Standard does specify a schema for a hierarchical register of feature concept dictionaries and feature catalogues. These registers are in accordance with ISO 19135.

2 Conformance

2.1 Introduction

To conform to this International Standard, all of the conditions specified for at least one of the two conformance classes described below shall be satisfied.

2.2 Conformance for a feature concept dictionary

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

a) ISO 19135, A.1, for general conformance to ISO 19135, and

b) B.2 of this International Standard.

A feature concept dictionary register established by ISO/TC 211 shall in addition satisfy all of the conditions specified in the ISO 19135 abstract test suite for registers established by ISO/TC 211 (ISO 19135, A.3).

2.3 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 International Standard shall satisfy all of the conditions specified in the following abstract test suites:

a) ISO 19135, A.1, for general conformance to ISO 19135,

b) ISO 19135, A.2 for conformance to ISO 19135 as a hierarchical register, and

c) B.3 of this International Standard.

A register of feature concept dictionaries and/or feature catalogues established by ISO/TC 211 shall in addition satisfy all of the conditions specified in the ISO 19135 abstract test suite for registers established by ISO/TC 211 (ISO 19135, A.3).

3 Normative references

The following referenced documents are indispensable for the application 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/TS 19103:2005, *Geographic information — Conceptual schema language*

ISO 19110:2005, *Geographic information — Methodology for feature cataloguing*

ISO 19115:2003, *Geographic information — Metadata*

ISO 19135:2005, *Geographic information — Procedures for item registration*

4 Terms, definitions and abbreviations

4.1 Terms and definitions

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

4.1.1
compound registry
registry containing multiple **registers** that share the same **item classes** and coordinated management of a common characteristic

NOTE The common characteristic may be a shared namespace for the assignment of names and/or codes.

4.1.2
data product
dataset or dataset series that conforms to a **data product specification**

[ISO 19131:2007, definition 4.6]

4.1.3
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

[ISO 19131:2007, definition 4.7]

4.1.4
data type
specification of a **value domain** with operations allowed on values in this domain

[ISO/TS 19103:2005, definition 4.1.5]

4.1.5
feature
abstraction of real world phenomena

[ISO 19101:2002, definition 4.11]

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

NOTE 1 A feature may occur as a type or an instance. In this International Standard, feature type is meant unless otherwise specified.

NOTE 2 This International Standard 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).

4.1.6
feature association
relationship that links instances of one **feature** type with instances of the same or a different feature type

[ISO 19110:2005, definition 4.2]

NOTE A feature association may occur as a type or an instance. In this International Standard, feature association type is meant unless otherwise specified.

4.1.7
feature association concept
concept that may be specified in detail as one or more **feature association** 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*).

4.1.8
feature attribute
characteristic of a **feature**

[ISO 19101:2002, definition 4.12]

EXAMPLE 1 A feature attribute named "colour" may have an attribute value "green" which belongs to the **data type** "text".

EXAMPLE 2 A feature attribute named "length" may have an attribute value "82,4" which belongs to the **data type** "real".

NOTE 1 A feature attribute may occur as a type or an instance. In this International Standard, feature attribute type is meant unless otherwise specified.

NOTE 2 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.

4.1.9
feature attribute concept
concept that may be specified in detail as one or more **feature attribute** types

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

4.1.10
feature catalogue
catalogue containing definitions and descriptions of the **feature** types, **feature attributes** and feature relationships occurring in one or more sets of geographic data, together with any **feature operations** that may be applied

[ISO 19101:2002, definition 4.13]

4.1.11
feature concept
concept that may be specified in detail as one or more **feature** types

EXAMPLE The feature concept "road" may 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 might have a limited set of attributes such as name, route number, location and number of lanes, while for a maintenance application it might have an extensive set of attributes detailing the structure and composition of each of the layers of material for which it is composed.

4.1.12
feature concept dictionary
dictionary that contains definitions of, and related descriptive information about, concepts that may be specified in detail in a **feature catalogue**

4.1.13
feature operation
operation that every instance of a **feature** type may perform

[ISO 19110:2005, definition 4.5]

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 The values of **feature attributes** of feature instances are affected by feature operations.

4.1.14
feature operation concept
concept that may be specified in detail as one or more **feature operation** types

EXAMPLE A "traffic flow" operation might 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.

4.1.15
hierarchical register
structured set of **registers** for a domain of register items, composed of a principal register and a set of **subregisters**

[ISO 19135:2005, definition 4.1.4]

EXAMPLE ISO 6523 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.

4.1.16
identifier
linguistically independent sequence of characters capable of uniquely and permanently identifying that with which it is associated

[ISO 19135:2005, definition 4.1.5]

4.1.17
item class
set of items with common properties

[ISO 19135:2005, definition 4.1.6]

NOTE 1 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 avoid potential ambiguity in this International Standard, the expression "register item class" is used.

4.1.18
nominal value
name of an object, type, or category

NOTE 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.

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

4.1.19
register
set of files containing **identifiers** assigned to items with descriptions of the associated items

[ISO 19135:2005, definition 4.1.9]

4.1.20
registry
information system on which a **register** is maintained

[ISO 19135:2005, definition 4.1.13]

4.1.21
subregister
part of **hierarchical register** that contains items from a partition of a domain of information

[ISO 19135:2005, definition 4.1.17]

4.1.22
value domain
set of accepted values

[ISO/TS 19103:2005, definition 4.1.15]

4.2 Abbreviations

DGIWG	Digital Geospatial Information Working Group
DFDD	DGIWG Feature Data Dictionary
IEC	International Electrotechnical Commission
IHO	International Hydrographic Organization
TC	Technical Committee
UML	Unified Modeling Language

5 Concepts

5.1 Introduction

A feature concept dictionary describes concepts that may be used to characterize real world phenomena. Feature types and feature property types may then be specified using these concepts and documented in a feature catalogue. This International Standard specifies a feature concept dictionary schema (5.2 and Clause 6).

ISO 19135 specifies procedures to be followed in preparing and maintaining registers of items of geographic information. Such registers may be used to support discovery of, access to, and use of the contents of feature concept dictionaries and feature catalogues. This International Standard specifies a schema for feature concept dictionaries as registers and information to be included in item registration proposals (Annex C).

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 International Standard 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, this International Standard 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 (Annex C).

5.2 Feature concept dictionary

A feature concept dictionary establishes a set of concepts that may be used to describe real world phenomena; these include 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 International Standard 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 of geographic information. Feature concept dictionaries and feature catalogues managed as registers may be published electronically, enabling the discovery and direct use of their contents. They may 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 specifies several alternatives for structuring registers:

a) A simple register contains items of a single item class (ISO 19135:2005, 7.1.2).

b) A multi-part register contains items from different item classes (ISO 19135:2005, 7.1.3).

c) A hierarchical register is a structured set of registers composed of a principal register and one or more subregisters (ISO 19135:2005, 7.1.4). 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 International Standard 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 may need to establish a suite of coordinated registers that share a common structure but are separated into individual registers within a compound registry.

EXAMPLE 1 A single community of interest may have geographic information requirements informed by several scientific disciplines. Each discipline may be best handled by a separate set of domain experts and/or domain authorities. For each, a separate control body, register manager and/or register owner may 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 may 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 may establish their own geographic information registers. They may 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 International Standard 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 19135:2005, 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.

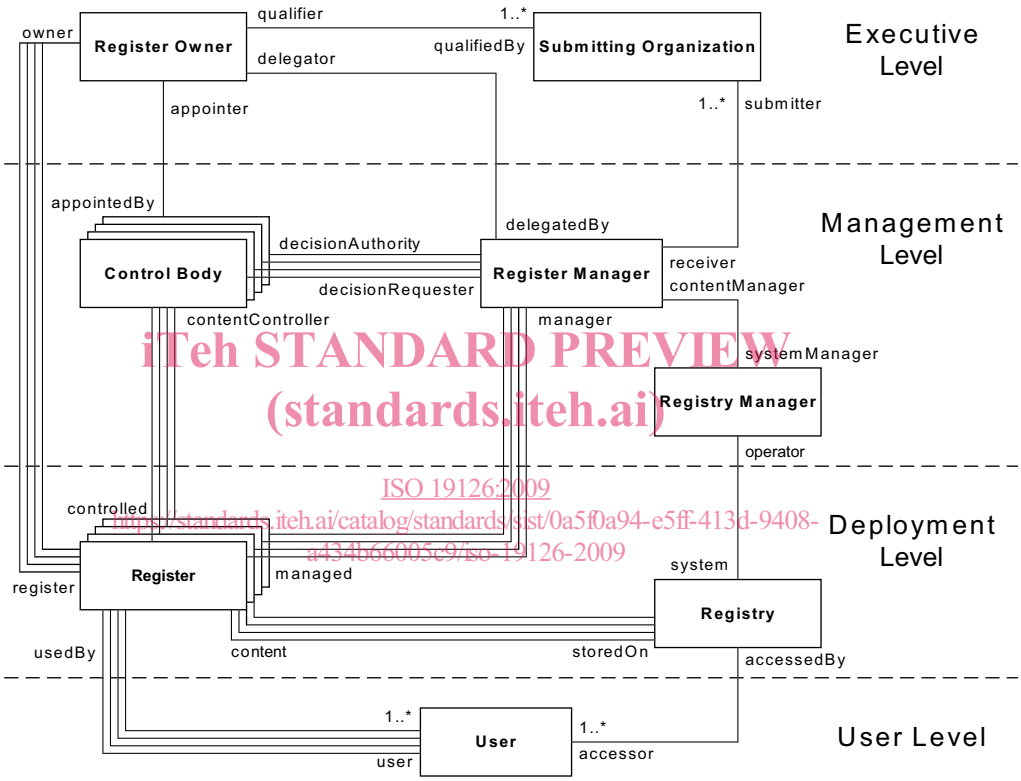

Figure 1 — Example compound registry

5.3.4 Register management and registration

ISO 19135 specifies how registers shall be managed (ISO 19135:2005, Clause 5) and the information that shall be included in any proposal for registration of an item of geographic information (ISO 19135:2005, Annex D).

Annex C of this International Standard 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.