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01-november-2013

Geografske informacije - Metodologija za objektne kataloge (ISO/DIS 19110:2013)

Geographic information - Methodology for feature cataloguing (ISO/DIS 19110:2013)

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ICS:

07.040	Astronomija. Geodezija. Geografija	Astronomy. Geodesy. Geography
35.240.70	Uporabniške rešitve IT v znanosti	IT applications in science

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 19110

ISO/TC **211**

Secretariat: **SN**

Voting begins on:
2013-09-05

Voting terminates on:
2014-02-05

Geographic information — Methodology for feature cataloguing

Information géographique — Méthodologie de catalogage des entités

[Revision of first edition (ISO 19110:2005) and ISO 19110:2005/Amd.1:2011]

ICS: 35.240.70

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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Foreword

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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 19110 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

This second edition cancels and replaces the first edition (ISO 19110:2005).

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Introduction

Geographic features are real world phenomena associated with a location relative to the Earth, about which data are collected, maintained, and disseminated. Feature catalogues defining the types of features, their operations, attributes, and associations represented in geographic data are indispensable to turning the data into usable information. Such feature catalogues promote the dissemination, sharing, and use of geographic data through providing a better understanding of the content and meaning of the data. Unless suppliers and users of geographic data have a shared understanding of the kinds of real world phenomena represented by the data, users will be unable to judge whether the data supplied are fit for their purpose.

The availability of standard feature catalogues that can be used multiple times will reduce costs of data acquisition and simplify the process of product specification for geographic datasets.

This International Standard provides a standard framework for organizing and reporting the classification of real world phenomena in a set of geographic data. Any set of geographic data is a greatly simplified and reduced abstraction of a complex and diverse world. A catalogue of feature types can never capture the richness of geographic reality. However, such a feature catalogue should present the particular abstraction represented in a given dataset clearly, precisely, and in a form readily understandable and accessible to users of the data.

Geographic features occur at two levels: instances and types. At the instance level, a geographic feature is represented as a discrete phenomenon that is associated with its geographic and temporal coordinates and may be portrayed by a particular graphic symbol. These individual feature instances are grouped into classes with common characteristics: feature types. It is recognized that geographic information is subjectively perceived and that its content depends upon the needs of particular applications. The needs of particular applications determine the way instances are grouped into types within a particular classification scheme. ISO 19109, Geographic information — Rules for application schema specifies how data shall be organized to reflect the particular needs of applications with similar data requirements.

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NOTE The full description of the contents and structure of a geographic dataset is given by the application schema developed in compliance with ISO 19109. The feature catalogue defines the meaning of the feature types and their associated feature attributes, feature operations and feature associations contained in the application schema.

This International Standard enables the multilingual description of application schemas compliant with ISO 19109. It goes further to provide a mechanism enabling a single global description of some properties occurring many times in an application schema and a binding of those global properties to the corresponding feature types.

The collection criteria used to identify individual real world phenomena and to represent them as feature instances in a dataset are not specified in this International Standard. Because they are not included in the standards, collection criteria should be included separately in the product specification for each dataset.

A standard way of organizing feature catalogue information will not automatically result in harmonization or interoperability between applications. In situations where classifications of features differ, this International Standard may at least serve to clarify the differences and thereby help to avoid the errors that would result from ignoring them. It may also be used as a standard framework within which to harmonize existing feature catalogues that have overlapping domains.

This revision of ISO 19110 addresses issues related to the multilingual management of feature catalogues and applies the changes documented in a previous amendment. In addition to removing minor inconsistencies in the conceptual schemas, the amendment enhanced the mechanism ensuring the management of global properties. The amendment also provided an XML Schema implementation of the feature catalogue conceptual schema and a management of feature catalogue registers. If the initial conceptual schema is not a subset of the amended conceptual schema, it is possible to transform legacy instances.

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Geographic information — Methodology for feature cataloguing

1 Scope

This International Standard defines the methodology for cataloguing feature types. This International Standard specifies how feature types can be organized into a feature catalogue and presented to the users of a set of geographic data. This International Standard is applicable to creating catalogues of feature types in previously uncatalogued domains and to revising existing feature catalogues to comply with standard practice. This International Standard applies to the cataloguing of feature types that are represented in digital form. Its principles can be extended to the cataloguing of other forms of geographic data. Feature catalogues are independent of feature concept dictionaries defined in ISO 19126 and can be specified without having to use or create a Feature Concept Dictionary.

This International Standard is applicable to the definition of geographic features at the type level. This International Standard is not applicable to the representation of individual instances of each type. This International Standard excludes portrayal schemas as specified in ISO 19117.

This International Standard may be used as a basis for defining the universe of discourse being modelled in a particular application, or to standardize general aspects of real world features being modelled in more than one application.

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2 Conformance

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2.1 Conformance classes

Because this International Standard specifies a number of options that are not required for all feature catalogues, this clause specifies five conformance classes. These classes are differentiated on the basis of the following criteria:

a) What elements of a feature type are required in a catalogue?

   1) feature attributes only?

   2) feature attributes and feature associations?

   3) feature attributes, feature associations, and feature operations?

b) Is there a requirement for defining global feature attributes, feature associations, and feature operations which may be bound to multiple feature types?

c) Is there a requirement to include inheritance relationships in the feature catalogue?

Annex A specifies a test module for each of the conformance classes, as shown in Table 1.

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Table 1 — Conformance classes

Attributes only	Attributes and associations	Attributes, associations and operations	Global Properties	Inheritance relationships included	Test Module
X	—	—	—	—	A.17
—	X	—	—	—	A.18
—	—	X	—	—	A.19
X	—	—	X	—	A.20
—	X	—	X	—	A.21
—	—	X	X	—	A.22
X	—	—	—	X	A.23
—	X	—	—	X	A.24
—	—	X	—	X	A.25
X	—	—	X	X	A.26
—	X	—	X	X	A.27
—	—	X	X	X	A.28

2.2 Specific standardization targets

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Test modules have been also defined for specific standardization targets:

a) A candidate XML Schema implementation of ISO 19110 shall pass the test module defined in A.29.1;

b) An XML document containing XML fragments referring to an XML Schema implementation of ISO 19110 conformant to this International Standard shall pass the module defined in A.30.1.

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c) A candidate feature catalogue register shall pass the test module defined in A.31.1;

d) Candidate registered feature catalogues shall pass the test module defined in A.32.1.

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 19109:2005, *Geographic information — Rules for application schema*

ISO 19115:2003, *Geographic information — Metadata*

ISO 19115:2003/Cor 1:2006, *Geographic information — Metadata — Technical Corrigendum 1*

ISO/TS 19135:2005, *Geographic Information — Procedures for item registration*

ISO 19136:2007, *Geographic Information — Geography Markup Language (GML)*

ISO/TS 19139:2007, *Geographic Information — Metadata — XML schema implementation*

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4 Terms and definitions

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

4.1
feature
abstraction of real world phenomena

Note 1 to entry: A feature may occur as a type or an instance. Feature type or feature instance should be used when only one is meant.

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

[SOURCE: ISO 19101-1:–[1)] , 4.1.11]

4.2
feature association
relationship that links instances of one *feature* (4.1) type with instances of the same or a different feature type

4.3
feature attribute
characteristic of a *feature* (4.1)

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 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.

[SOURCE: ISO 19101-1:–[1)] , 4.1.12]

4.4
feature catalogue
catalogue containing definitions and descriptions of the *feature* (4.1) types, *feature attributes* (4.3), *feature inheritance*s (4.7) and *feature associations* (4.2) occurring in one or more sets of geographic data, together with any *feature operations* (4.5) that may be applied

[SOURCE: ISO 19101-1:–[1)] , 4.1.13]

4.5
feature operation
operation that every instance of a *feature* (4.1) 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: Sometimes feature operations provide a basis for feature type definition.

4.6
functional language
language in which *feature operations* (4.5) are formally specified

Note 1 to entry: In a functional language, feature types may be represented as abstract data types.

1) To be published.

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4.7
feature inheritance
mechanism by which more specific *features* (4.1) incorporate structure and behaviour of more general features related by behaviour

5 Abbreviations

DGIWG	Defence Geospatial Information Working Group
DIGEST	Digital Geographic Information Exchange Standard
FACC	Feature and Attribute Coding Catalogue
GFC	Geographic Feature Cataloguing
GFM	General Feature Model
HTTP	Hyper Text Transfer Protocol
IHO	International Hydrographic Organization
TS	Technical Specification
UML	Unified Modeling Language
URI	Uniform Resource Identifier
XML	eXtensible Markup Language

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6 Principal requirements

6.1 Feature catalogue

A feature catalogue shall present the abstraction of reality represented in one or more sets of geographic data. The basic level of abstraction in a feature catalogue shall be the feature type. A feature catalogue shall be available in electronic form for any set of geographic data that contains features. A feature catalogue may also comply with the specifications of this International Standard independently of any existing set of geographic data.

6.2 Information elements

6.2.1 Introduction

The following clauses specify general and specific requirements for feature catalogue information elements. Annex B specifies detailed requirements. Annex C specifies XML encoding for feature catalogues, Annex D specifies concepts that permit the management of feature catalogues either in a multi-part register or in a hierarchical register containing multi-part subregisters, accordingly to ISO 19135. Annex E illustrates the application of these requirements. Annex F discusses the application of feature operations as the conceptual basis for determining feature types in a feature catalogue. Annex G provides an example of XML implementation of this International Standard. Annex H provides guidance for transforming of legacy feature catalogues so they conform to this International Standard. Annex I defines the resources related to this International Standard and their location.

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6.2.2 Completeness

A conceptual schema and a data dictionary for the representation of feature catalogues are specified in Annex B. A feature catalogue prepared according to Annex B shall document all the feature types found in a given set of geographic data. The feature catalogue shall include identification information as specified in Annex B. The feature catalogue shall include definitions and descriptions of all feature types contained in the data, including any feature attributes and feature associations contained in the data that are associated with each feature type, and optionally including feature operations that are supported by the data. To ensure predictability and comparability of feature catalogue content across different applications, it is recommended that the feature catalogue should include only the elements specified in Annex B. To maximize the usefulness of a feature catalogue across different applications, the use of a conceptual schema language to model feature catalogue information is recommended.

NOTE Natural-language definitions, feature-type aliases, criteria for the creation and withdrawal of feature instances, and other semantic elements of the feature catalogue may be included in a conceptual schema as structured comments or as attributes.

6.2.3 General requirements

6.2.3.1 Form of names

All feature types and feature properties (i.e. feature attributes, feature associations, association roles, and feature operations) included in a feature catalogue shall be identified by a name. The name of a feature type is unique within that feature catalogue. The name of a feature property (whether the feature property is a global property bound to the feature type or is local to the feature type) is unique within its feature type. The name of a global feature property is unique within that feature catalogue.

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6.2.3.2 Form of definitions

Definitions of feature types, feature attributes, feature attribute listed values, feature associations, association roles, and feature operations shall be given in a natural language. These definitions shall be included in the catalogue, unless the catalogue specifies a separate definition source. If the same term appears in both the definition source and the feature catalogue, the definition in the feature catalogue shall apply.

6.2.4 Requirements for feature types

Each feature type shall be identified by a name and defined in at least in one natural language, possibly referring to a definition source (typically a feature concept dictionary or a natural language dictionary) as described in 6.2.3.2. Each feature type may also be identified by an alphanumeric code that is unique within the catalogue and it may have a set of aliases. The feature catalogue shall also include, for each feature type, its feature operations and associated feature attributes, feature associations and association roles, if any. The use of functional language specifications to help define feature types is recommended.

6.2.5 Requirements for feature operations

Feature operations, if any, shall be identified and defined for each feature type. Feature attributes involved in each feature operation shall be specified as well as any feature types affected by the operation. The definition shall include a natural language definition and may be formally specified in a functional language.

6.2.6 Requirements for feature attributes

Feature attributes, if any, shall be identified and defined for each feature type. The definition shall include a natural language definition and a specified data type for values of the attribute. Each feature attribute may also be identified by an alphanumeric code that is unique within the catalogue.

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