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## Geographic information — Rules for application schema

*Information géographique — Règles de schéma d'application*

[Revision of first edition (ISO 19109:2005)]

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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

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.

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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.

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ISO 19109 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

This second edition cancels and replaces the first edition (ISO 19109:2005), which has been technically revised.

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## Introduction

Any description of reality is always an abstraction, always partial, and always just one of many possible “views”, depending on the application field.

The widespread application of computers and geographic information systems (GIS) has led to an increased use of geographic data within multiple disciplines. With current technology as an enabler, society’s reliance on such data is growing. Geographic datasets are increasingly being shared and exchanged. They are also used for purposes other than those for which they were produced.

To ensure that data will be understood by both computer systems and users, the data structures for data access and exchange must be fully documented. The interfaces between systems, therefore, need to be defined with respect to data and operations, using the methods standardized in this International Standard. For the construction of internal software and data storage within proprietary systems, any method may be used that enables the standardized interfaces to be supported.

An application schema provides the formal description of the data structure and content required by one or more applications. An application schema contains the descriptions of both geographic data and other related data. A fundamental concept of geographic data is the feature.

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# Geographic information — Rules for application schema

## 1 Scope

This International Standard defines rules for creating and documenting application schemas, including principles for the definition of features.

The scope of this International Standard includes the following:

- conceptual modelling of features and their properties from a universe of discourse;
- definition of application schemas;
- use of the conceptual schema language for application schemas;
- transition from the concepts in the conceptual model to the data types in the application schema;
- integration of standardized schemas from other ISO geographic information standards with the application schema.

The following are outside the scope:

- choice of one particular conceptual schema language for application schemas;
- definition of any particular application schema;
- representation of feature types and their properties in a feature catalogue;
- representation of metadata;
- rules for mapping one application schema to another;
- implementation of the application schema in a computer environment;
- computer system and application software design;
- programming.

## 2 Conformance

### 2.1 General

This International Standard defines 12 conformance classes shown in Tables 1 to 12, matching the 12 requirements classes described in Clauses 7 and 8. Any application schema claiming conformance to any requirements class in this International Standard shall pass all of the tests listed in the corresponding conformance class, which are described in detail in the abstract test suites in Annex A. Each test relates to one or more specific requirements, which are explicitly indicated in the description of the test.

## 2.2 Meta-model

Table 1 — Meta-model conformance class

| Conformance class | /conf/general                     |
|-------------------|-----------------------------------|
| Requirements      | /req/general (Clause 7, Table 15) |
| Tests             | All tests in A.2                  |

## 2.3 UML application schema

Table 2 — UML application schema conformance class

| Conformance class | /conf/uml                |
|-------------------|--------------------------|
| Dependency        | /conf/general (2.2)      |
| Requirements      | /req/uml (8.2, Table 16) |
| Tests             | All tests in A.3         |

## 2.4 Profiling standard schema

Table 3 — Profiling standard schema conformance class

| Conformance class | /conf/profile                |
|-------------------|------------------------------|
| Dependency        | /conf/uml (2.3)              |
| Requirements      | /req/profile (8.3, Table 19) |
| Tests             | All tests in A.4             |

## 2.5 Metadata

Table 4 — Metadata conformance class

| Conformance class | /conf/metadata                |
|-------------------|-------------------------------|
| Dependency        | /conf/uml (2.3)               |
| Requirements      | /req/metadata (8.4, Table 20) |
| Tests             | All tests in A.5              |

## 2.6 Quality

Table 5 — Quality conformance class

| Conformance class | /conf/quality                |
|-------------------|------------------------------|
| Dependency        | /conf/uml (2.3)              |
| Requirements      | /req/quality (8.5, Table 21) |
| Tests             | All tests in A.6             |

## 2.7 Temporal

**Table 6 — Temporal conformance class**

| Conformance class | /conf/temporal                |
|-------------------|-------------------------------|
| Dependency        | /conf/uml (2.3)               |
| Requirements      | /req/temporal (8.6, Table 23) |
| Tests             | All tests in A.7              |

## 2.8 Spatial

**Table 7 — Spatial conformance class**

| Conformance class | /conf/spatial                |
|-------------------|------------------------------|
| Dependency        | /conf/uml (2.3)              |
| Requirements      | /req/spatial (8.7, Table 25) |
| Tests             | All tests in A.8             |

## 2.9 Coverages

**Table 8 — Coverages conformance class**

| Conformance class | /conf/coverage                |
|-------------------|-------------------------------|
| Dependency        | /conf/uml (2.3)               |
| Requirements      | /req/coverage (8.8, Table 27) |
| Tests             | All tests in A.9              |

## 2.10 Observations

**Table 9 — Observations conformance class**

| Conformance class | /conf/observation                |
|-------------------|----------------------------------|
| Dependency        | /conf/uml (2.3)                  |
| Requirements      | /req/observation (8.9, Table 29) |
| Tests             | All tests in A.10                |

## 2.11 Spatial referencing by identifiers

Table 10 — Spatial referencing by identifiers conformance class

| Conformance class | /conf/identifier                 |
|-------------------|----------------------------------|
| Dependency        | /conf/uml (2.3)                  |
| Requirements      | /req/identifier (8.10, Table 30) |
| Tests             | All tests in A.11                |

## 2.12 Code-list

Table 11 — Code-list conformance class

| Conformance class | /conf/codeList                 |
|-------------------|--------------------------------|
| Dependency        | /conf/uml (2.3)                |
| Requirements      | /req/codeList (8.11, Table 31) |
| Tests             | All tests in A.12              |

## 2.13 Multi-lingual support

Table 12 — Multi-lingual support conformance class

| Conformance class | /conf/multi-lingual                 |
|-------------------|-------------------------------------|
| Dependency        | /conf/uml (2.3)                     |
| Requirements      | /req/multi-lingual (8.12, Table 32) |
| Tests             | All tests in A.13                   |

## 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.

IETF RFC 5646 (2009), Tags for identifying languages

ISO 19103:—<sup>1)</sup>, *Geographic information — Conceptual schema language*

ISO 19107:2003, *Geographic information — Spatial schema*

ISO 19108:2002, *Geographic information — Temporal schema*

ISO 19112:2003, *Geographic information — Spatial referencing by geographic identifiers*

1) To be published.

ISO 19115-1:—<sup>2)</sup>, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19115-2:2009, *Geographic information — Metadata — Part 2: Extensions for imagery and gridded data*

ISO 19123:2005, *Geographic information — Schema for coverage geometry and functions*

ISO 19156:2011, *Geographic information — Observations and measurements*

ISO 19157:—<sup>3)</sup>, *Geographic information — Data Quality*

ISO 19505-2:2012, *Information technology — Object Management Group Unified Modeling Language (OMG UML) — Part 2: Superstructure (Version 2.4.1)*

## 4 Terms and definitions

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

### 4.1

#### **application**

manipulation and processing of data in support of user requirements

[SOURCE: ISO 19101-1:—<sup>4)</sup>, 4.1.1 ]

### 4.2

#### **application schema**

*conceptual schema* ( 4.5) for data required by one or more *applications* (4.1)

[SOURCE: ISO 19101-1:—<sup>4)</sup>, 4.1.2]

### 4.3

#### **complex feature**

*feature* (4.9) composed of other features

### 4.4

#### **conceptual model**

*model* (4.15) that defines concepts of a *universe of discourse* (4.19)

[SOURCE: ISO 19101-1:—<sup>4)</sup>, 4.1.5]

### 4.5

#### **conceptual schema**

formal description of a *conceptual model* (4.4)

[SOURCE: ISO 19101-1:—<sup>4)</sup>, 4.1.6]

### 4.6

#### **coverage**

*feature* (4.9) that acts as a function to return *values* (4.20) from its range for any direct position within its spatial, temporal or spatiotemporal *domain* (4.8)

[SOURCE: ISO 19123:2005, 4.1.7]

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2) To be published

3) To be published.

4) To be published.