SLOVENSKI STANDARD
oSIST prEN ISO 19109:2024

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Geografske informacije - Osnovni podatkovni model in pravila za aplikacijsko shemo (ISO/DIS 19109:2024)

Geographic information - General feature model and rules for application schema (ISO/DIS 19109:2024)

Geoinformationen - Grundlegendes Datenmodell und Regeln zur Erstellung von Anwendungsschemata (ISO/DIS 19109:2024)

Information géographique - Modèle général des entités et règles relatives au schéma d'application (ISO/DIS 19109:2024)

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Foreword

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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).

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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 third edition cancels and replaces the second edition (ISO 19109:2015), which has been technically revised.

The main changes are as follows:

— Changes in the title and scope

— New sub-clauses discussing the concept of the General Feature Model

— Re-organization of Clause 7 to include only concepts of the General Feature Model and moving the general rules for application schema to Clause 8

— Updating the dependencies to other ISO/TC 211 standards to reflect classes in respective latest versions

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

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 document. 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.

This document aims to express the importance of continuing the modelling of geospatial information according to the concepts contained in this document.

Geographic information — General feature model and rules for application schema

1 Scope

This document defines the General Feature Model (GFM) as the metamodel for creating application schemas in the context of geo-information modelling. The GFM is explained and implemented as rules for creating and documenting application schemas, including principles for the definition of features.

The scope of this document includes the following:

— conceptual modelling of features and their properties from a universe of discourse;

— definition of application schemas;

— general rules for using a conceptual schema language for application schemas;

— rules for application schemas using UML as the conceptual schema language;

— 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 schemas;

— 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 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* Available at https://www.rfc-editor.org/info/rfc5646

ISO/DIS 19103 :—,[1)] *Geographic information — Conceptual schema language*

ISO 19107: 2019, *Geographic information — Spatial schema*

ISO 19108:2002/Cor 1:2006, *Geographic information — Temporal schema*

ISO 19112:2019, *Geographic information — Spatial referencing by geographic identifiers*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19115-1:2014/Amd 1:2018, *Geographic information — Metadata — Part 1: Fundamentals — Amendment 1*

ISO 19115-1:2014/Amd 2:2020, *Geographic information — Metadata — Part 1: Fundamentals — Amendment 2*

ISO 19115-2:2019/Amd 1:2022, *Geographic information — Metadata — Part 2: Extensions for imagery and gridded data*

ISO 19123-1:2023, *Geographic information — Schema for coverage geometry and functions – Part 1: Fundamentals*

ISO 19156:2023, *Geographic information — Observations and measurements*

ISO 19157-1:2023, *Geographic information — Data quality — Part 1: General requirements*

OBJECT MANAGEMENT GROUP (OMG). *Unified Modeling Language (UML)* [online]. Version 2.5.1. December 2017. Available from: https://www.omg.org/spec/UML/2.5.1

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp
— IEC Electropedia: available at https://www.electropedia.org/

3.1
application
manipulation and processing of data in support of user requirements

[SOURCE: ISO 19101-1:2014, 4.1.1]

3.2
application schema
conceptual schema for data required by one or more applications

[SOURCE: ISO 19101-1:2014, 4.1.2]

3.3
complex feature
feature composed of other features

[1)] Under preparation.

3.4ss
conceptual model
model that defines concepts of a universe of discourse

[SOURCE: ISO 19101-1:2014, 4.1.5]

3.5
conceptual schema
formal description of a conceptual model

[SOURCE: ISO 19101-1:2014, 4.1.6]

3.6
coverage
function which returns values from its range for any direct position within its domain

[SOURCE: ISO 19123-1:2023, 3.1.8]

3.7
dataset
identifiable collection of data

[SOURCE: ISO 19115-1:2014, 4.3]

3.8
domain
well-defined set

Note 1 to entry: Well-defined means that the definition is both necessary and sufficient, as everything that satisfies the definition is in the set and everything that does not satisfy the definition is necessarily outside the set.

3.9
feature
abstraction of real-world phenomena

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

[SOURCE: ISO 19101-1:2014, 4.1.11]

3.10
feature association
relationship that links instances of one feature type with instances of the same or a different feature type

[SOURCE: ISO 19110:2016, 3.3]

3.11
feature attribute
characteristic of a feature

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

Note 2 to entry: A feature attribute type has a name, a data type and a domain associated with it. A feature attribute instance has an attribute value taken from the domain of the feature attribute type.

[SOURCE: ISO 19101-1:2014, 4.1.12, modified – EXAMPLES and Notes have been removed and two new Notes to entry have been added.]

3.12
geographic data
data with implicit or explicit reference to a location relative to the Earth

Note 1 to entry: Geographic information is also used as a term for information concerning phenomena implicitly or explicitly associated with a location relative to the Earth.

3.13
metadata
information about a resource

[SOURCE: ISO 19115-1:2014, 4.10]

3.14
model
abstraction of some aspects of reality

3.15
observation
act carried out by an observer to determine the value of an observable property of an object (feature-of-interest) by using a procedure, with the value is provided as the result

[SOURCE: ISO 19156:2023, 3.13]

3.16
property
facet or attribute of an object referenced by a name

[SOURCE: ISO 19143:2010, 4.21]

3.17
quality
degree to which a set of inherent characteristics of an object fulfils requirements

[SOURCE: ISO 9000:2015, 3.6.2]

3.18
universe of discourse
view of the real or hypothetical world that includes everything of interest

[SOURCE: ISO 19101-1:2014, 4.1.38]

3.19
value
element of a type domain

[SOURCE: ISO/IEC 19501:2005, 0000_5]

4 Conformance

4.1 General

This document defines 14 conformance classes shown in Tables 1 to 14, matching the 14 requirements classes described in Clause 8. Any application schema claiming conformance to any requirements class in this document 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.

4.2 Meta-Model

Table 1 — Meta-model conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general
Requirements	/req/general (Clause 8.2, Table 16)
Tests	All tests in A.2

4.3 Spatial

Table 2 — Spatial conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general/spatial
Dependency	/conf/general (4.2)
Requirements	/req/general/spatial (8.3, Table 17)
Tests	All tests in A.3

4.4 Temporal

Table 3 — Temporal conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general/temporal
Dependency	/conf/general (4.2)
Requirements	/req/general/temporal (8.4, Table 19)
Tests	All tests in A.4

4.5 Quality

Table 4 — Quality conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general/quality
Dependency	/conf/general (4.2)
Requirements	/req/general/quality (8.5, Table 21)
Tests	All tests in A.5

4.6 Spatial referencing by identifiers

Table 5 — Spatial referencing by identifiers conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general/identifier
Dependency	/conf/general (4.2)
Requirements	/req/general/identifier (8.6, Table 22)
Tests	All tests in A.8

4.7 Coverages

Table 6 — Coverages conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general/coverage
Dependency	/conf/general (4.2)
Requirements	/req/general/coverage (8.8, Table 23)
Tests	All tests in A.7

4.8 Observations

Table 7 — Observations conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/general/observation
Dependency	/conf/general (4.2)
Requirements	/req/general/observation (8.9, Table 25)
Tests	All tests in A.8

4.9 UML application schema

Table 8 — UML application schema conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/uml
Dependency	/conf/general (4.2)
Requirements	/req/uml (8.10.1, Table 26)
Tests	All tests in A.10

4.10 Spatial attributes in UML

Table 9 — Spatial attributes in UML conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/uml/spatial
Dependency	/conf/uml (4.10)
Requirements	/req/uml/spatial (8.10.7, Table 28)
Tests	All tests in A.11

4.11 Temporal attributes in UML

Table 10 — Temporal attributes in UML conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/uml/temporal
Dependency	/conf/uml (4.10)
Requirements	/req/uml/temporal (8.10.8, Table 29)
Tests	All tests in A.12

4.12 Quality attributes in UML

Table 11 — Quality attributes in UML conformance class<Tbl_medium></Tbl_medium>

Conformance class	/conf/uml/quality
Dependency	/conf/uml (4.10)
Requirements	/req/uml/quality (8.10.9, Table 30)
Tests	All tests in A.13