International Standard

ISO 19103

Geographic information — Conceptual schema language

Information géographique — Langage de schéma conceptuel

Second edition
2024-09

Reference number
ISO 19103:2024(en)

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Published in Switzerland

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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 document 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 second edition cancels and replaces the first edition (ISO 19103:2015), which has been technically revised.

The main changes are as follows:

— conformance to UML 2.5.1 has been improved;

  — the UML profile has been improved and the stereotypes Leaf, CodeList and Union have been deprecated;

  — the collection data types, the name data types, the extension data types and data type Any have been removed;

— alignment with the data types described in ISO/IEC 11404:2007, Clause 8 and Clause 10 has been improved;

— the conformance classes for conceptual schemas modelled in UML 1.x and for conceptual schemas modelled in another conceptual schema language have been removed;

— the normative references have been updated, in particular:

  — addition of UML 2.5.1 and removal of ISO/IEC 19505-2:2012 (equivalent to UML 2.4.1, Superstructure[4]);

  — removal of the Object Constraint Language (OCL) specification.

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Introduction

This document is concerned with the adoption and use of a conceptual schema language (CSL) for developing computer-interpretable models, or schemas, of geographic information. Standardization of geographic information requires the use of a formal CSL to specify unambiguous schemas that can serve as a basis for data interchange. An important goal of the ISO 19100 family of documents is to create a framework in which data interchange and service interoperability can be realized across multiple implementation environments. The adoption and consistent use of a CSL to specify geographic information is of fundamental importance in achieving this goal.

There are two aspects to this document. First, a CSL is selected that meets the requirements for rigorous representation of geographic information. Several CSLs exist, of which two predominate in the geographic domain: the Unified Modeling Language (UML), specified by the Object Management Group (OMG), on the one hand, and the combination of the three Semantic Web specifications, the Resource Description Framework Schema (RDFS), the Web Ontology Language (OWL) and the Shapes Constraint Language (SHACL), specified by the World Wide Web Consortium (W3C), on the other hand. It was decided to continue using UML as it has proven its capability within the ISO 19100 family of documents, it supports a model-driven approach and it has a standardized graphical notation. This document identifies a subset of UML as the CSL for the specification of conceptual schemas. It also specifies a UML profile for the specification of conceptual schemas, and it specifies provisions on how to use UML and the UML profile to create conceptual schemas that are a basis for achieving the goal of interoperability. In addition, this document defines a set of core data type definitions for use in conceptual schemas.

One goal of the ISO 19100 family of documents using conceptual schemas specified in UML is that they will provide a basis for model-based mapping to encoding schemas like those defined in ISO 19118, as well as a basis for creating implementation specifications for implementation profiles for various other environments.

This document describes the general metamodel for the use of UML in the context of ISO geographic information documents. Aspects specifically dealing with the modelling of application schemas are described in ISO 19109.

In accordance with the ISO/IEC Directives, Part 2, 2021, *Principles and rules for the structure and drafting of ISO and IEC documents*, in International Standards the decimal sign is a comma on the line. However, the General Conference on Weights and Measures (*Conférence Générale des Poids et Mesures*) at its meeting in 2003 passed unanimously the following resolution: “The decimal marker shall be either a point on the line or a comma on the line.”[5] In practice, the choice between these alternatives depends on customary use in the language concerned. In the technical areas of geodesy and geographic information it is customary for the decimal point always to be used, for all languages. That practice is used throughout this document.

The name and contact information of the maintenance agency for this document can be found at www.iso.org/maintenance_agencies.

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Geographic information — Conceptual schema language

1 Scope

This document specifies provisions for the use of a conceptual schema language within the context of modelling geographic information. The chosen conceptual schema language is a subset of the Unified Modeling Language (UML).

This document specifies a UML profile for modelling geographic information.

This document specifies a set of core data types for use in conceptual schemas.

The standardization target type of this document is conceptual schemas describing geographic information.

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.

UML 2.5.1: OBJECT MANAGEMENT GROUP (OMG). *Unified Modeling Language (UML)* [online]. Version 2.5.1. December 2017. Available at: 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
abstract
<information technology> filter out detail that is not within the scope of interest

Note 1 to entry: Abstracting facilitates the understanding of the essence of a *concept* (3.20) and allows for handling complexity.

Note 2 to entry: An act of abstracting is designated as an “abstraction”. In the information technology domain, the term “abstraction” also represents concept *abstraction* (3.4).

3.2
abstract classifier
<UML> *classifier* (3.16) that has no direct *instances* (3.42)

Note 1 to entry: UML 2.5.1, 9.2.3.2 requires that every instance of an abstract classifier is an instance of one of its specializations.

Note 2 to entry: Adapted from UML 2.5.1, 9.2.3.2.

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