

ICS 07.040; 35.240.70
CCS A 75



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 42986.1-2023

Geographic information - Ontology - Part 1: Framework

Issued on: September 7, 2023

Implemented on: September 7, 2023

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Introduction	
1 Scope	1
2 Normative reference documents	1
3 Terms and Definitions	1
4 Abbreviations	3
5 Consistency	3
6 Ontology in geographical information	3
6.1 Overview	3
6.2 Ontological value	4
6.3 Related matters	4
7 frame	4
7.1 Overview	4
7.2 Ontology development rules based on Web Ontology Language (OWL)	5
7.3 Semantic operators	6
7.4 Service ontology	6
7.5 Domain ontology register	7
7.6 Service ontology register	7
7.7 Coordination ontology	7
7.8 Dependencies of packages in the framework	7
Appendix A (Normative) Abstract Test Suite	9
Appendix B (informative) Background information of the ontology	14
Appendix C (Informative) Ontology Matching	23
Reference	25

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is Part 1 of GB/T 42986 "Geographic Information Ontology". GB/T 42986 has released the following parts.

---Part 1. Framework.

This document is modified using ISO /T S19150-1.2012 "Geographical Information Ontology Part 1.Framework". File type consists of ISO

The technical specifications are adjusted to my country's national standards.

Compared with ISO /T S19150-1.2012, this document has made the following structural adjustments.

---Adjusted Chapter 2 "Consistency" of the original text to Chapter 5.

The technical differences between this document and ISO /T S19150-1.2012 and their reasons are as follows.

---Changed the normative reference documents, replaced the replaced documents with the currently effective versions, and unified them into undated references (use

The list of normatively cited documents remains consistent with the cited documents).

The following editorial changes have been made to this document.

---Changed the source of the term 3.4, replaced the replaced international standard with Chinese documents, and marked "with modifications";

---Added a note to term 3.9 to make it easier to understand, and deleted the source (has been replaced);

---Changed the documents cited in Figures 1, 7.8, and Appendix B, updated the replaced documents, and deleted the abolished documents.

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

Introduction

The World Wide Web (WWW), since its inception, has been a data set with a specific syntax (structure) but no meaning to machines (semantics)

network. Nowadays, the Data Web introduces the Semantic Web (Semantic Web), by adding machine-processable data (with embedded language).

meaning) rather than just documents, the Semantic Web becomes an extension of the existing Data Web. Think of the World Wide Web as a huge global open data

Database allows people to query real-world phenomena or events from their own perspective, understanding, or abstraction, and obtain accurate, detailed and

appropriate answer. This approach includes ontology-based reasoning capabilities. With the introduction of the concept of "linked data", various data from different sources are

Connected together on the Web via HTTPURIs. As a result, the Semantic Web and "linked

data" have brought new technologies to the field of geographic information.

opportunities, providing a new generation of standards for realizing semantic interoperability of geographical information.

The ontology contains the formal representation of the phenomena of the language world based on basic vocabulary, including the definitions made in clarifying the original meaning and describing the phenomena.

rightness and axioms and the relationship between them. It supports the representation of concepts and the interpretation and reasoning of data to meet semantic interoperability.

Data from different disciplines, including geographic information, can be integrated and help solve problems ranging from specific problems (such as oil spills) to global problems (such as

climate change).

GB/T 42986 is planned to consist of 6 parts.

---Part 1.Framework. Defines a high-level framework standard to specifically handle the semantics of geographic information through ontologies operate.

---Part 2.Ontology development rules based on Web Ontology Language (OWL). Defines the rules for the development of OWL-DL ontology and

Guidelines, including mapping between UML class diagram elements and OWL-DL and description rules for OWL-DL application patterns.

---Part 3.Semantic operators. Semantic proximity operators between concepts are defined to complement geometric and spatiotemporal operators.

---Part 4.Service ontology. The framework of marking service ontology and the definition of Web services describing geographical information ontology language.

---Part 5.Domain ontology register. An international registration system that defines geographic information domain ontology and its maintenance.

---Part 6.Service ontology register. Define the geographical information service ontology and the international registration system for its maintenance.

These parts together form the coordinated ontology of ISO /TC211 (International Organization for Standardization Geographic Information Technology Committee), forming a A set of OWL-DL ontology, which converts and supplements the ISO /TC211 coordination model developed based on UML.

This document is mainly for the convenience of developers of geographic information standards. It is also suitable for information system analysts and ISO geographic information standard program planners.

planners and developers. This document will help improve understanding of the basic principles of semantic interoperability and applications of geographic information.

Geographic Information Ontology Part 1. Framework

1 Scope

This document defines a framework for semantic interoperability of geographic information. This framework defines the standard semantics required to use ontologies to process geographic information

High-level models of components.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations

For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to

this document.

Note. GB/T 35647-2017 Geographic Information Concept Pattern Language (ISO 19103.2015, IDT)

Note. GB/T 25530-2010 Geographic Information Services (ISO 19119.2005, IDT)
registration)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

application schema
application schema

A conceptual schema (3.3) of data (3.4) required by one or more applications.

[Source. GB/T 33188.1-2016, 4.1.2]

3.2

conceptual model
conceptual model