



# SLOVENSKI STANDARD

## SIST EN ISO 19109:2006

01-september-2006

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### Geografske informacije – Pravila za aplikacijsko shemo (ISO 19109:2005)

Geographic information - Rules for application schema (ISO 19109:2005)

Geoinformation - Regeln zur Erstellung von Anwendungsschemata (ISO 19109:2005)

Information géographique - Règles de schéma d'application (ISO 19109:2005)

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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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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 19109**

July 2006

ICS 35.240.70

English Version

**Geographic information - Rules for application schema (ISO  
19109:2005)**

Information géographique - Règles de schéma d'application  
(ISO 19109:2005)

Geoinformation - Regeln zur Erstellung von  
Anwendungsschemata (ISO 19109:2005)

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**EN ISO 19109:2006 (E)****Foreword**

The text of ISO 19109:2005 has been prepared by Technical Committee ISO/TC 211 "Geographic information/Geomatics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 19109:2006 by Technical Committee CEN/TC 287 "Geographic Information", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2007, and conflicting national standards shall be withdrawn at the latest by January 2007.

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**Geographic information — Rules for  
application schema**

*Information géographique — Règles de schéma d'application*

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**ISO 19109:2005(E)****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.

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

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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

Any application schema claiming conformance to this International Standard shall pass all of the requirements described in the abstract test suites in Annex A.

**ISO 19109:2005(E)****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:—<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*

ISO 19113:2002, *Geographic information — Quality principles*

ISO 19115:2003, *Geographic information — Metadata*

ISO/IEC 19501, *Information technology — Open Distributed Processing — Unified Modeling Language (UML) Version 1.4.2*

**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

[ISO 19101]

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**4.2 application schema**

conceptual schema for data required by one or more applications

[ISO 19101]

**4.3 complex feature**

feature composed of other features

**4.4 conceptual model**

model that defines concepts of a universe of discourse

[ISO 19101]

**4.5 conceptual schema**

formal description of a conceptual model

[ISO 19101]

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1) To be published.

**4.6****dataset**

identifiable collection of data

[ISO 19115]

**4.7****domain**

well-defined set

[ISO 19107]

NOTE 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.

**4.8****feature**

abstraction of real-world phenomena

NOTE A feature may occur as a type or an instance. Feature type or feature instance should be used when only one is meant.

[ISO 19101]

**4.9****feature association**

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

[ISO 19110]

**4.10****feature attribute**

characteristic of a feature

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NOTE 1 A feature attribute may occur as a type or an instance. Feature attribute type or feature attribute instance is used when only one is meant.

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

[adapted from ISO 19101]

**4.11****feature operation**

operation that every instance of a feature type may perform

EXAMPLE 1 A feature operation upon the feature type “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”.

EXAMPLE 2 A feature operation by the feature type “dam” might be to block vessels from navigating along a watercourse.

[adapted from ISO 19110]

**4.12****geographic data**

data with implicit or explicit reference to a location relative to the earth

NOTE Geographic information is also used as a term for information concerning phenomena implicitly or explicitly associated with a location relative to the earth.

**ISO 19109:2005(E)****4.13****metadata**

data about data

[ISO 19115]

**4.14****model**

abstraction of some aspects of reality

**4.15****portrayal**

presentation of information to humans

[ISO 19117]

**4.16****quality**

totality of characteristics of a product that bear on its ability to satisfy stated and implied needs

[ISO 19101]

**4.17****universe of discourse**

view of the real or hypothetical world that includes everything of interest

[ISO 19101]

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**5 Presentation and abbreviations** [SIST EN ISO 19109:2006](#)

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**5.1 Presentation**

This International Standard describes how to create an application schema that integrates conceptual schemas defined in the ISO 19100 series of International Standards for geographic information. In addition to stating the rules for creating application schemas, this International Standard provides guidance through examples. This International Standard adopts the following conventions for presentation purposes:

**a) Rules:**

All rules are normative, and are described as follows.

**Rules:**

- 1) <Rule 1>
- 2) <Rule 2>

**b) Tables:**

Tables that are not referenced from the rules are informative.

**c) Conceptual schemas:**

Conceptual schemas in the normative part of this International Standard are presented in the Unified Modelling Language (UML) in conformance with ISO/TS 19103. UML diagrams are presented in compliance with ISO/IEC 19501.

## 5.2 Abbreviations

CSL	Conceptual schema language
GFM	General feature model
OCL	Object constraint language
UML	Unified modelling language

## 6 Context

### 6.1 Purpose of an application schema

An application schema is a conceptual schema for data required by one or more applications. An application schema defines

- content and structure of data; and
- specifications of operations for manipulating and processing data by an application.

The purpose of an application schema is twofold:

- to provide a computer-readable data description defining the data structure, which makes it possible to apply automated mechanisms for data management; and
- to achieve a common and correct understanding of the data, by documenting the data content of the particular application field, thereby making it possible to unambiguously retrieve information from the data.

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### 6.2 Rules for application schema

This International Standard does not standardize application schemas; it only defines rules for creating application schemas in a consistent manner (including the consistent definition of features) to facilitate the acquiring, processing, analysing, accessing, presenting and transferring of geographic data between different users, systems and locations. The rules in this International Standard are, in the case of data transfer or interchange, used by suppliers and users of geographic data to

- build a transfer application schema for data interchange;
- interpret the semantics of the transferred dataset with respect to user's local data and content and structure of data; and
- determine the necessary transformations between the two datasets.

The rules in this International Standard will assist the users of applications with similar data requirements in creating a common application schema for the interface between their systems and data. This includes an agreement about the elements from the universe of discourse. This is described in more detail in 6.3.

The mapping from one application schema to another application schema may be difficult and even impossible if the two schemas are too divergent. The mapping is facilitated if the application schema used within a system is designed considering also the requirements for the data interchange. The rules can also be used for building an application schema used within a system, although such application schemas are not within the scope of this International Standard.

The creation of an application schema is a process. The content of an application schema has to be settled according to the view of reality in the universe of discourse. This is modelled in terms of types of features and their properties. Clause 7 contains principles for consistently defining features.