

SLOVENSKI STANDARD
oSIST prEN ISO 19136-1:2018
01-oktober-2018

**Geografske informacije - Jezik za označevanje geografskih podatkov (GML) - 1.
del: Osnove (ISO/DIS 19136-1:2018)**

Geographic information - Geography Markup Language (GML) - Part 1: Fundamentals

Geoinformation - Geography Markup Language (GML) (ISO 19136:2007); Englische
Fassung EN ISO 19136:2009

Ta slovenski standard je istoveten z: prEN ISO 19136-1

ICS:

07.040	Astronomija. Geodezija. Geografija	Astronomy. Geodesy. Geography
35.060	Jeziki, ki se uporabljajo v informacijski tehniki in tehnologiji	Languages used in information technology
35.240.70	Uporabniške rešitve IT v znanosti	IT applications in science

oSIST prEN ISO 19136-1:2018

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f6a2a0b-b2d8-4212-924d-9b98808af244/sist-en-iso-19136-1-2020>

DRAFT INTERNATIONAL STANDARD

ISO/DIS 19136-1

ISO/TC 211

Secretariat: SIS

Voting begins on:
2018-08-14Voting terminates on:
2018-11-06

Geographic information — Geography Markup Language (GML) —

Part 1: Fundamentals

*Information géographique — Langage de balisage en géographie (GML) —
Partie 1: Titre manqué*

ICS: 35.240.70

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f66a2a0b-b2d8-4212-924d-9b98808af244/sist-en-iso-19136-1-2020>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 19136-1:2018(E)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f86a2a0b-b2d8-4212-924d-9b98808af244/sist-en-iso-19136-1-2020>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Warning

OGC official documents use a triple decimal-dot notation (i.e. MM.xx.ss). This document may be identified as MM.xx (Major.minor) and may include increments to the third dot series (schema changes) without any modification to this document, or the version displayed on the document. This means, for example, that a document labelled with versions 1.1.0 and 1.1.1 or even 1.1.9 are exactly the same except for modifications to the official schemas that are maintained and perpetually located at: <http://schemas.opengis.net/>. Note that corrections to the document are registered via corrigendums. A corrigendum will change the base document and notice will be given by appending a c# to the version (where # specifies the corrigendum number). In corrigendums that correct both the schemas and the base document, the third triplet of the document version will increment and the 'c1' or subsequent identifier will be appended, however the schemas will only increase the third triplet of the version.

This document is an OGC Standard. Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

iTeh STANDARD PREVIEW
(standards.itih.ai)

Full standard:
<https://standards.itih.ai/catalog/standards/sist/f66a2a0b-b2d8-4212-924d-9b98808af244/sist-en-iso-19136-1-2020>

ISO/DIS 19136-1:2018(E)

ISO 19136-1:2008

Contents

Page

Foreword.....	v
Introduction	vi
1 Scope	1
2 Conformance.....	1
2.1 Conformance requirements.....	1
2.2 Conformance classes related to GML application schemas.....	2
2.3 Conformance classes related to GML profiles	2
2.4 Conformance classes related to GML documents.....	4
2.5 Conformance classes related to software implementations.....	4
3 Normative references	4
4 Terms and symbols	5
4.1 Terms and definitions.....	5
4.2 Symbols and abbreviated terms	13
5 Conventions	14
5.1 XML namespaces.....	14
5.2 Versioning	14
5.3 Deprecated parts of previous versions of GML.....	15
5.4 UML notation.....	15
5.5 XML Schema.....	16
6 Overview of the GML schema.....	16
6.1 GML schema.....	16
6.2 GML application schemas	17
6.3 Relationship between the ISO 19100 series of International Standards, the GML schema and GML application schemas	18
6.4 Organization of this International Standard.....	19
6.5 Deprecated and experimental schema components.....	20
7 GML schema — General rules and base schema components	20
7.1 GML model and syntax	20
7.2 gmlBase schema components	22
8 GML schema — Xlinks and basic types	34
8.1 Xlinks — Object associations and remote properties	34
8.2 Basic types	35
9 GML schema — Features.....	44
9.1 General concepts.....	44
9.2 Relationship with ISO 19109.....	45
9.3 Features	45
9.4 Standard feature properties.....	45
9.5 Geometry properties.....	47
9.6 Topology properties	50
9.7 Temporal properties	50
9.8 Defining application-specific feature types	52
9.9 Feature collections	52
9.10 Spatial reference system used in a feature or feature collection	54

10	GML schema — Geometric primitives.....	54
10.1	General concepts	54
10.2	Abstract geometric primitives.....	61
10.3	Geometric primitives (0-dimensional).....	61
10.4	Geometric primitives (1-dimensional).....	62
10.5	Geometric primitives (2-dimensional).....	75
10.6	Geometric primitives (3-dimensional).....	85
11	GML schema — Geometric complex, geometric composites and geometric aggregates	87
11.1	Overview.....	87
11.2	Geometric complex and geometric composites	88
11.3	Geometric aggregates.....	91
12	GML schema — Coordinate reference systems schemas	96
12.1	Overview.....	96
12.2	Reference systems.....	98
12.3	Coordinate reference systems.....	100
12.4	Coordinate systems	108
12.5	Datums.....	116
12.6	Coordinate operations	122
13	GML schema — Topology	136
13.1	General concepts	136
13.2	Abstract topology.....	136
13.3	Topological primitives	137
13.4	Topological collections.....	141
13.5	Topology complex.....	144
14	GML schema — Temporal information and dynamic features	146
14.1	General concepts	146
14.2	Temporal schema	147
14.3	Temporal topology schema.....	155
14.4	Temporal reference systems.....	158
14.5	Representing dynamic features.....	165
15	GML schema — Definitions and dictionaries	170
15.1	Overview.....	170
15.2	Dictionary schema.....	170
16	GML schema — Units, measures and values	173
16.1	Introduction.....	173
16.2	Units schema	173
16.3	Measures schema.....	179
16.4	Value objects schema.....	180
17	GML schema — Directions	188
17.1	Direction schema.....	188
17.2	direction, DirectionPropertyType.....	188
17.3	DirectionVectorType	188
17.4	DirectionDescriptionType.....	189
18	GML schema — Observations.....	190
18.1	Observations.....	190
18.2	Observation schema	190
19	GML schema — Coverages	194
19.1	The coverage model and representations	194
19.2	Grids schema.....	198
19.3	Coverage schema.....	201

ISO/DIS 19136-1:2018(E)

ISO 19136-1:2008

20	Profiles	217
20.1	Profiles of GML and application schemas	217
20.2	Definition of profile	218
20.3	Relation to application schema	218
20.4	Rules for elements and types in a profile	218
20.5	Rules for referencing GML profiles from application schemas	219
20.6	Recommendations for application schemas using GML profiles	220
20.7	Summary of rules for GML profiles	220
21	Rules for GML application schemas	221
21.1	Instances of GML objects	221
21.2	GML application schemas	221
21.3	Schemas defining Features and Feature Collections	224
21.4	Schemas defining spatial geometries	225
21.5	Schemas defining spatial topologies	227
21.6	Schemas defining time	228
21.7	Schemas defining coordinate reference systems	228
21.8	Schemas defining coverages	229
21.9	Schemas defining observations	231
21.10	Schemas defining dictionaries and definitions	232
21.11	Schemas defining values	233
21.12	GML profiles of the GML schema	233
Annex A	(normative) Abstract test suites for GML application schemas, GML profiles and GML documents	236
Annex B	(normative) Abstract test suite for software implementations	251
Annex C	(informative) GML schema	255
Annex D	(normative) Implemented Profile of the ISO 19100 series of International Standards and Extensions	257
Annex E	(normative) UML-to-GML application schema encoding rules	325
Annex F	(normative) GML-to-UML application schema encoding rules	347
Annex G	(informative) Guidelines for subsetting the GML schema	357
Annex H	(informative) Default styling	371
Annex I	(informative) Backwards compatibility with earlier versions of GML	383
Annex J	(informative) Modularization and dependencies	401
Bibliography	403
Index	405

Foreword

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The OGC shall not be held responsible for identifying any or all such patent rights.

Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

The Geography Markup Language (GML) was originally developed within the Open Geospatial Consortium, Inc. (OGC). ISO 19136 was prepared by ISO/TC 211 jointly with the OGC.

This version is a corrigendum to GML 3.2.1 (ISO 19136:2007). It addresses the OGC Change Request 12-092 (gml:id attribute on LinearRing) by applying the following changes:

- the XML attribute gml:id in gml:AbstractGMLType has been made optional;
- the elements gml:AbstractRing and gml:Shell have been added to the substitutionGroups gml:AbstractCurve and gml:AbstractSurface respectively;
- the types gml:AbstractRingType and gml:ShellType are now extended from base types gml:AbstractCurveType and gml:AbstractSurfaceType respectively;

These changes correct inconsistencies with ISO 19107 without breaking the validity of instance documents created using the GML 3.2.1 schema. I.e., all GML 3.2 instance documents that are valid against the GML 3.2.1 schema are also valid against the GML 3.2.2 schema.

The corrected GML 3.2 schema is available at <http://schemas.opengis.net/gml/3.2.1/>. Note that the use of "3.2.1" in the URL is unchanged since this version (3.2.2) is a corrigendum and the corrected schema replaces the GML 3.2.1 schema. Previous versions of the GML 3.2.1 schema are available at http://schemas.opengis.net/gml/gml-3_2_1.zip.

The change to the gml:id attribute reverts a change that has been made between GML 3.1.1 and GML 3.2.1. Reverting this change also addresses comments raised by several communities since the release of GML 3.2.1 / ISO 19136:2007.

As the correction relaxes a constraint in the XML schema, not all instance documents created based on the GML 3.2.2 schema will be valid against the GML 3.2.1 schema:

- all GML 3.2 instance documents that include a gml:id attribute on a ring or shell element are not valid against the GML 3.2.1 schema;
- all GML 3.2 instance documents that include a feature, a spatial object or a temporal object without a gml:id attribute are not valid against the GML 3.2.1 schema.

Local copies of the GML 3.2.1 schema documents have to be replaced by the GML 3.2.2 schema documents – or be replaced by links to <http://schemas.opengis.net/gml/3.2.1/gml.xsd>.

This corrigendum also updates URIs – mainly in examples – where OGC policies have changed since the release of GML 3.2.1 (location of the Xlink schema document, use of OGC HTTP URIs for coordinate reference systems).

As the corrigendum is currently not published by ISO, the reference to the normative schema documents in Annex C now refers to the OGC schema repository.

ISO/DIS 19136-1:2018(E)

ISO 19136-1:2008

Introduction

Geography Markup Language is an XML grammar written in XML Schema for the description of application schemas as well as the transport and storage of geographic information.

The key concepts used by Geography Markup Language (GML) to model the world are drawn from the ISO 19100 series of International Standards and the OpenGIS Abstract Specification.

A feature is an “abstraction of real world phenomena” (ISO 19101); it is a geographic feature if it is associated with a location relative to the Earth. So a digital representation of the real world may be thought of as a set of features. The state of a feature is defined by a set of properties, where each property may be thought of as a {name, type, value} triple.

The number of properties a feature may have, together with their names and types, is determined by its type definition. Geographic features with geometry are those with properties that may be geometry-valued. A feature collection is a collection of features that may itself be regarded as a feature; as a consequence a feature collection has a feature type and thus may have distinct properties of its own, in addition to the features it contains.

Following ISO 19109, the feature types of an application or application domain is usually captured in an application schema. A GML application schema is specified in XML Schema and can be constructed in two different and alternative ways:

- by adhering to the rules specified in ISO 19109 for application schemas in UML, and conforming to both the constraints on such schemas and the rules for mapping them to GML application schemas specified in this International Standard;
- by adhering to the rules for GML application schemas specified in this International Standard for creating a GML application schema directly in XML Schema.

Both ways are supported by this International Standard. To ensure proper use of the conceptual modelling framework of the ISO 19100 series of International Standards, all application schemas are expected to be modelled in accordance with the General Feature Model as specified in ISO 19109. Within the ISO 19100 series, UML is the preferred language by which to model conceptual schemas.

GML specifies XML encodings, conformant with ISO 19118, of several of the conceptual classes defined in the ISO 19100 series of International Standards and the OpenGIS Abstract Specification. These conceptual models include those defined in:

- ISO/TS 19103 — Conceptual schema language (units of measure, basic types);
- ISO 19107 — Spatial schema (geometry and topology objects);
- ISO 19108 — Temporal schema (temporal geometry and topology objects, temporal reference systems);
- ISO 19109 — Rules for application schemas (features);
- ISO 19111 — Spatial referencing by coordinates (coordinate reference systems);
- ISO 19123 — Schema for coverage geometry and functions.

The aim is to provide a standardized encoding (i.e. a standardized implementation in XML) of types specified in the conceptual models specified by the International Standards listed above. If every application schema were encoded independently and the encoding process included the types from, for example, ISO 19108, then, without unambiguous and completely fixed encoding rules, the XML encodings would be different. Also, since every

implementation platform has specific strengths and weaknesses, it is helpful to standardize XML encodings for core geographic information concepts modelled in the ISO 19100 series of International Standards and commonly used in application schemas.

In many cases, the mapping from the conceptual classes is straightforward, while in some cases the mapping is more complex (a detailed description of the mapping is part of this International Standard).

In addition, GML provides XML encodings for additional concepts not yet modelled in the ISO 19100 series of International Standards or the OpenGIS Abstract Specification, for example, dynamic features, simple observations or value objects.

Predefined types of geographic feature in GML include coverages and simple observations.

A coverage is a subtype of feature that has a coverage function with a spatiotemporal domain and a value set range of homogeneous 1- to n -dimensional tuples. A coverage may represent one feature or a collection of features “to model and make visible spatial relationships between, and the spatial distribution of, Earth phenomena” (OGC Abstract Specification Topic 6^[20]) and a coverage “acts as a function to return values from its range for any direct position within its spatiotemporal domain” (ISO 19123).

An observation models the act of observing, often with a camera or some other procedure, a person or some form of instrument (Merriam-Webster Dictionary: “an act of recognizing and noting a fact or occurrence often involving measurement with instruments”). An observation is considered to be a GML feature with a time at which the observation took place, and with a value for the observation.

A reference system provides a scale of measurement for assigning values to a position, time or other descriptive quantity or quality.

A coordinate reference system consists of a set of coordinate system axes that is related to the Earth through a datum that defines the size and shape of the Earth.

A temporal reference system provides standard units for measuring time and describing temporal length or duration.

A reference system dictionary provides definitions of reference systems used in spatial or temporal geometries.

Spatial geometries are the values of spatial feature properties. They indicate the coordinate reference system in which their measurements have been made. The “parent” geometry element of a geometric complex or geometric aggregate makes this indication for its constituent geometries.

Temporal geometries are the values of temporal feature properties. Like their spatial counterparts, temporal geometries indicate the temporal reference system in which their measurements have been made.

Spatial or temporal topologies are used to express the different topological relationships between features.

A units of measure dictionary provides definitions of numerical measures of physical quantities, such as length, temperature and pressure, and of conversions between units.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f6a2a0b-b2d8-4212-924d-9b98808af244/sist-en-iso-19136-1-2020>

ISO 19136-1:2008

Geographic information — Geography Markup Language (GML) — Part 1: Fundamentals

1 Scope

The Geography Markup Language (GML) is an XML encoding in compliance with ISO 19118 for the transport and storage of geographic information modelled in accordance with the conceptual modelling framework used in the ISO 19100 series of International Standards and including both the spatial and non-spatial properties of geographic features.

This International Standard defines the XML Schema syntax, mechanisms and conventions that:

- provide an open, vendor-neutral framework for the description of geospatial application schemas for the transport and storage of geographic information in XML;
- allow profiles that support proper subsets of GML framework descriptive capabilities;
- support the description of geospatial application schemas for specialized domains and information communities;
- enable the creation and maintenance of linked geographic application schemas and datasets;
- support the storage and transport of application schemas and datasets;
- increase the ability of organizations to share geographic application schemas and the information they describe.

Implementers may decide to store geographic application schemas and information in GML, or they may decide to convert from some other storage format on demand and use GML only for schema and data transport.

NOTE If an ISO 19109 conformant application schema described in UML is used as the basis for the storage and transportation of geographic information, this International Standard provides normative rules for the mapping of such an application schema to a GML application schema in XML Schema and, as such, to an XML encoding for data with a logical structure in accordance with the ISO 19109 conformant application schema.

2 Conformance

2.1 Conformance requirements

Clauses 7 to 19 of this International Standard specify XML Schema components, i.e. the GML schema, which shall be used in GML application schemas in accordance with Clause 21. Clause 20 specifies rules for the specification of a GML profile that may be defined for use in a GML application schema.

Few applications will require the full range of capabilities described by the GML schema. This clause, therefore, defines a set of conformance classes that will support applications whose requirements range from the minimum necessary to define simple feature types to full use of the GML schema.

Most of the schema components specified in this International Standard implement concepts defined in the ISO 19100 series of International Standards. In these cases, the conformance classes defined in this International Standard are based on the conformance classes defined in the corresponding standard.