Irish Standard
I.S. EN ISO 19136-2:2018

Geographic information - Geography Markup Language (GML) - Part 2: Extended schemas and encoding rules (ISO 19136-2:2015)

I.S. EN ISO 19136-2:2018

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National Foreword

I.S. EN ISO 19136-2:2018 is the adopted Irish version of the European Document EN ISO 19136-2:2018, Geographic information - Geography Markup Language (GML) - Part 2: Extended schemas and encoding rules (ISO 19136-2:2015)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 19136-2

September 2018

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English Version

Geographic information - Geography Markup Language (GML) - Part 2: Extended schemas and encoding rules (ISO 19136-2:2015)

Information géographique - Langage de balisage en géographie (GML) - Partie 2: Schémas étendus et règles d'encodage (ISO 19136-2:2015)

Geoinformation - Geography Markup Language (GML) - Teil 2: Erweitertes Schema und Kodierregeln

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European foreword

The text of ISO 19136-2:2015 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 19136-2:2018 by Technical Committee CEN/TC 287 "Geographic Information" the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by March 2019, and conflicting national standards shall be withdrawn at the latest by March 2019.

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

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The text of ISO 19136-2:2015 has been approved by CEN as EN ISO 19136-2:2018 without any modification.

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INTERNATIONAL STANDARD

ISO 19136-2

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Geographic information — Geography Markup Language (GML) —

Part 2: Extended schemas and encoding rules

Information géographique — Langage de balisage en géographie (GML) —

Partie 2: Schémas étendus et règles d'encodage

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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. www.iso.org/directives

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The Geography Markup Language (GML) was originally developed within the Open Geospatial Consortium (OGC). The Committee responsible for this document is ISO/TC 211, *Geographic information/Geomatics*.

ISO 19136 consists of the following parts, under the general title *Geographic Information — Geography Markup Language*:

— *Part 2: Extended schemas and encoding rules*

A future Part 1 will revise and replace the currently available ISO 19136:2007.

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 part of ISO 19136;

— by adhering to the rules for GML application schemas specified in this part of ISO 19136 for creating a GML application schema directly in XML Schema.

Both ways are supported by this part of ISO 19136. 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, *Geographic information — Conceptual schema language* (units of measure, basic types)*;*

— ISO 19107, *Geographic information — Spatial schema* (geometry and topology objects)*;*

— ISO 19108, *Geographic information — Temporal schema* (temporal geometry and topology objects, temporal reference systems)*;*

— ISO 19109, *Geographic information — Rules for application schemas* (features)*;*

— ISO 19111, *Geographic information — Spatial referencing by coordinates* (coordinate reference systems)*;*

— ISO 19123, *Geographic information — Schema for coverage geometry and functions;*

— ISO 19148, *Geographic information — Linear referencing.*

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 part of ISO 19136).

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) 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.

Geographic information — Geography Markup Language (GML) —

Part 2: Extended schemas and encoding rules

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 part of ISO 19136 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.

This part of ISO 19136 builds on ISO 19136:2007 (GML 3.2), and extends it with additional schema components and requirements.

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 part of ISO 19136 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

This part of ISO 19136 defines XML implementations of concepts used in spatiotemporal datasets. It extends the XML implementations specified in ISO 19136:2007 (GML 3.2). Requirements and conformance classes specified in ISO 19136:2007 also apply for this part of ISO 19136.

XML instances that encode geographic information using one or more of the schemas specified in this part of ISO 19136 are the standardization target of the requirements stated in this part of ISO 19136.

The implementation is described using the XML Schema language and Schematron.

Conformance classes are specified in Clauses 6 to 12 of this part of ISO 19136.