INTERNATIONAL STANDARD

ISO 19131

Second edition
2022-11

Geographic information — Data product specifications

Information géographique — Spécifications de contenu informationnel

Reference number
ISO 19131:2022(E)

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Published in Switzerland

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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.

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 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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 19131:2007), which has been technically revised. It also incorporates ISO 19131:2007/Amd 1:2011.

The main changes are as follows:

— XML encoding has been added;

— mandatory sections working as place holders have been introduced;

— the UML model has been restructured, introducing new/renamed attributes and elements, and ISO 19115-1 datatypes have been used where possible;

— new attributes and elements have been introduced to separate information in the overview (6.2.7.2).

— in subclause 6.2.7, "Class IdentificationSection,":

  — the description and identification of the data product has been clearly separated from the description and identification of the specification,

  — the data type for attribute *purpose* has been changed to allow explanation of the purpose of the data product using use cases,

  — the attribute *extent* has been changed to allow specification of temporal and vertical extent, in addition to the geographical extent, and

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  - a new attribute *restriction* has been introduced, used to describe handling restrictions of the data product;

- in the Scope:
  - relations between scopes have been removed (the concept of super- and sub-scopes), and
  - a provision has been introduced requiring that at least one of the attributes *level*, *levelName*, or *extent* be used for each scope;
- the Data content and structure section (6.5) has been restructured using elements from ISO 19115-1;
- in the Reference systems section (6.6), **t**he data type of the attribute *temporalReferenceSystem* has been changed;
- in the Data quality section (6.7):
  - the requirement to list data quality elements that have no defined quality requirements has been removed, and
  - a new attribute *requirementId* has been introduced, to be able to reference a specific data quality requirement in other contexts;
- in the Data capture and production section (6.8), new elements and attributes have been introduced, to contain information previously located in the attribute *dataCaptureStatement*;
- in the Maintenance section (6.9), information about maintenance has been made mandatory, and the data type of the attribute *maintenanceAndUpdateFrequency* has been changed, with a new mandatory attribute introduced;
- in the Delivery section (6.11), a new attribute *deliveryService* has been introduced;
- the Metadata section (6.12) has been restructured and new attributes introduced to specify the metadata standard and encoding to be used, as well as a possibility to describe how specific metadata elements should be used;
- a recommended layout has been introduced;
- a detailed overview regarding changes and backwards compatibility can be found in Annex B.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

A data product specification is a specification of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party. In this context of creating, supplying and using data products, the specification thereof is of essence in a controlled and standardized process leading to interoperability. The data product specification is the final product in a process that describes the conceptual formalization of semantics and data structure related to specific requirements or use cases. It is a precise and full description of the data product in terms of the requirements that it will or may fulfil. A data product specification is primarily a technical document that may contain non-technical elements such as narrative descriptions of some aspects, like the overview or data capture statements. However, for various reasons compromises can need to be made in the implementation.

The purpose of this document is to provide requirements on the content of data product specifications, in conformance with other existing International Standards for geographic information. This conformance is at different levels. Firstly, there is the aspect of a dataset and its metadata conforming to a data product specification, and secondly that the data product specification conforms to this document. Some of the items used to specify the data product in a data product specification can also be used as metadata for a data product that conforms to the data product specification. Figure 1 shows how a data product specification relates to datasets and their metadata.

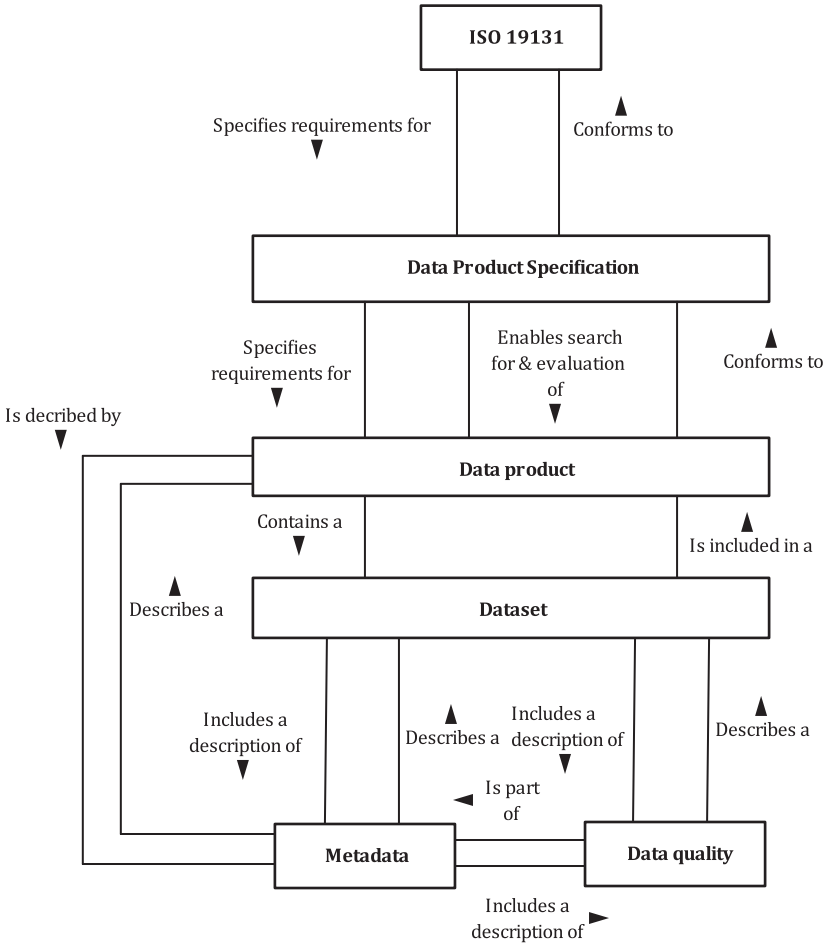


Figure 1 — Relations between this document (ISO 19131), the data product specification and the datasets

A data product specification may be created and used on different occasions, by different parties and for different reasons. It may, for example, be used for the original process of collecting data as well as

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for products derived from already existing data. It may be created by producers to specify their product or by users to state their requirements.

This document describes the content, structure and encoding of a data product specification.

This document contains URIs for normative statements, conformance classes, conformance tests and requirements classes. Other International Standards are also referenced with URIs. URIs to normative statements within this document are a combination of the namespace https://standards.isotc211.org/19131/-/2 and the local identifier. The description of elements in the local identifiers can be found at https://committee.iso.org/sites/tc211/home/resolutions/isotc-211-good-practices/--structure-of-uris-in-isotc-211.html.

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 — Data product specifications

1 Scope

This document describes requirements for the specification of geographic data products, based upon the concepts of other International Standards in the ISO 19100 family of standards. It also provides guidance in the creation of data product specifications, so that they can be easily understood and fit for their intended purpose.

This document specifies XML encoding of data product specifications.

This document provides OWL representation of the underlying UML model. See Annex F.

This document is intended for use by data producers, data providers, service providers and potential users of data products.

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.

ISO 639-2, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

ISO 19103, *Geographic information — Conceptual schema language*

ISO 19108, *Geographic information — Temporal schema*

ISO 19115-1, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19157, *Geographic information — Data quality*

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
application
manipulation and processing of data in support of user requirements

[SOURCE: ISO 19101-1:2014, 4.1.1]

3.2
application schema
conceptual schema (3.4) for data required by one or more *applications* (3.1)

[SOURCE: ISO 19101-1:2014, 4.1.2]

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3.3
conceptual model
model that defines concepts of a *universe of discourse* (3.23)

[SOURCE: ISO 19101-1:2014, 4.1.5]

3.4
conceptual schema
formal description of a *conceptual model* (3.3)

[SOURCE: ISO 19101-1:2014, 4.1.6]

3.5
conformance quality level
threshold value or set of threshold values for data *quality* (3.20) results used to determine how well a *dataset* (3.10) meets the criteria set forth in its *data product specification* (3.9) or user requirements

Note 1 to entry: In the context of ISO 19131, dataset refers to data product.

[SOURCE: ISO 19157-1:—[1)], 3.3, modified — Note 1 to entry has been added.]

3.6
coverage
feature (3.13) that acts as a function to return values from its range for any direct position within its domain

[SOURCE: ISO 19123-1:—[2)], 3.1.8]

3.7
data capture
action or process of collecting data

Note 1 to entry: The capture can be by human interaction (such as field observation) or by machines.

3.8
data product
dataset (3.10) or *dataset series* (3.11) that may be supplied

Note 1 to entry: A data product may contain additional information such as *portrayal* (3.19), data *quality* (3.20), *metadata* (3.17) and distribution format.

3.9
data product specification
specification (3.21) of a *data product* (3.8) together with additional information that will enable it to be created, supplied to and used by another party

Note 1 to entry: A data product specification provides a description of the *universe of discourse* (3.23) and a specification for mapping the universe of discourse to a data product. It may be used for production, sales, end-use or other purposes.

3.10
dataset
identifiable collection of data

Note 1 to entry: A dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or *feature* (3.13) type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single feature or *feature attribute* (3.15) contained within a larger dataset. A hardcopy map or chart may be considered a dataset.

[SOURCE: ISO 19115-1:2014, 4.3]

1) Under preparation. Stage at the time of publication: ISO/FDIS 19157-1:2022.

2) Under preparation. Stage at the time of publication: ISO/DIS 19123-1:2022.

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3.11
dataset series
collection of *datasets* (3.10) sharing common characteristics

[SOURCE: ISO 19115-1:2014, 4.4]

3.12
domain
well-defined set

Note 1 to entry: "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.

[SOURCE: ISO 19109:2015, 4.8]

3.13
feature
abstraction of real-world phenomena

Note 1 to entry: A feature may occur as a type or an instance. Feature type or feature instance shall be used when only one is meant.

[SOURCE: ISO 19101-1:2014, 4.1.11]

3.14
feature association
relationship that links instances of one *feature* (3.13) type with instances of the same or a different feature type

Note 1 to entry: A *feature* (3.13) association may occur as a type or an instance. Feature association type or feature association instance is used when only one is meant.

Note 2 to entry: Feature associations include aggregation of features.

[SOURCE: ISO 19110:2016, 3.3]

3.15
feature attribute
characteristic of a *feature* (3.13)

Note 1 to entry: A *feature* (3.13) attribute has a name, a data type and a value *domain* (3.12) associated to it. A feature attribute for a feature instance has an attribute value taken from the value domain.

Note 2 to entry: A *feature* (3.13) attribute may occur as a type or an instance. Feature attribute type or feature attribute instance is used when only one is meant.

[SOURCE: ISO 19101-1:2014, 4.1.12, modified — EXAMPLES 1 and 2 were deleted, Notes 2 and 3 to entry were deleted and a new Note 2 to entry has been added.]

3.16
geographic data
data with implicit or explicit reference to a location relative to the Earth

Note 1 to entry: Geographic information is also used as a term for information concerning phenomena implicitly or explicitly associated with a location relative to the Earth.

[SOURCE: ISO 19109:2015, 4.13]

3.17
metadata
information about a resource

[SOURCE: ISO 19115-1:2014, 4.10]

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3.18
model
abstraction of some aspects of reality

[SOURCE: ISO 19109:2015, 4.15]

3.19
portrayal
representation of information for human interpretation

3.20
quality
degree to which a set of inherent characteristics of an object fulfils requirements

[SOURCE: ISO 9000:2015, 3.6.2, modified — Notes 1 and 2 to entry have been deleted.]

3.21
specification
document containing requirements and abstract test cases for those requirements

[SOURCE: ISO 19105:2022, 3.22]

3.22
specification scope
definition of a part of a *data product* (3.8) with certain characteristics

Note 1 to entry: A specification scope may be based on spatial or temporal extent, certain *feature* (3.13) types or properties or product hierarchy, for example.

3.23
universe of discourse
view of the real or hypothetical world that includes everything of interest

[SOURCE: ISO 19101-1:2014, 4.1.38]

4 Symbols and abbreviated terms

4.1 Abbreviated terms

This document adopts the following conventions for presentation purposes:

UML Unified Modeling Language

XML Extensible Markup Language

URI Uniform Resource Identifier

OWL Web Ontology Language

4.2 Unified Modeling Language

In this document, conceptual schemas are presented in the Unified Modeling Language (UML). ISO 19103 presents the specific profile of UML used in this document.

4.3 Externally defined classes

Several model elements used in this document are defined in packages specified in other International Standards; these are listed in Table 1.

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