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Geographic information — Data product specifications

Information géographique — Spécifications de contenu informationnel

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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.

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 19131 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

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Introduction

A data product specification is a detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party. It is a precise technical description of the data product in terms of the requirements that it will or may fulfil. However, the data product specification only defines how the dataset should be. For various reasons, compromises may need to be made in the implementation. The metadata associated with the product dataset should reflect how the product dataset actually is.

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

The purpose of this International Standard is to provide practical help in the creation of data product specifications, in conformance with other existing standards for geographic information. An aim is to produce a complete list of the items used to specify a data product.

This International Standard makes references to parts of existing standards. Some of the items used to specify the data in a data product can also be used as metadata for a resulting dataset with the same data product.

It is not necessary for a data product specification to specify the production process, but only the resulting data product. Nevertheless, it may include production and maintenance aspects if judged necessary to describe the data product.

This International Standard describes the content and structure of a data product specification. An example of a data product specification is presented in Annex F.

When an item for a data product specification is already defined in another standard of the ISO 19100 series, a reference to that document is explicitly made.

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

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Geographic information — Data product specifications

1   Scope

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

2   Conformance

Any data product specification claiming conformance with this International Standard shall pass all the requirements described in the abstract test suites in Annex A.

3   Normative references

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

ISO/TS 19103, *Geographic information — Conceptual schema language*

ISO 19107, *Geographic information — Spatial schema*

ISO 19108, *Geographic information — Temporal schema*

ISO 19109:2005, *Geographic information — Rules for application schema*

ISO 19110, *Geographic information — Methodology for feature cataloguing*

ISO 19111, *Geographic information — Spatial referencing by coordinates*

ISO 19112, *Geographic information — Spatial referencing by geographic identifiers*

ISO 19113, *Geographic information — Quality principles*

ISO 19115, *Geographic information — Metadata*

ISO 19117, *Geographic information — Portrayal*

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

ISO/TS 19138, *Geographic information — Data quality measures*

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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]

4.2
application schema
conceptual schema for data required by one or more **applications**

[ISO 19101]

4.3
conceptual model
model that defines concepts of a **universe of discourse**

[ISO 19101]

4.4
conceptual schema
formal description of a **conceptual model**

[ISO 19101]

4.5
coverage
feature that acts as a function to return values from its range for any direct position within its spatial, temporal or spatiotemporal **domain**

[ISO 19123]

EXAMPLES   Raster image, polygon overlay, digital elevation matrix.

4.6
data product
dataset or **dataset series** that conforms to a **data product specification**

4.7
data product specification
detailed description of a **dataset** or **dataset series** together with additional information that will enable it to be created, supplied to and used by another party

NOTE   A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a dataset. It may be used for production, sales, end-use or other purposes.

4.8
dataset
identifiable collection of data

[ISO 19115]

NOTE   A dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single feature or feature attribute contained within a larger dataset. A hardcopy map or chart may be considered a dataset.

4.9
dataset series
collection of **datasets** sharing the same product specification

[ISO 19115]

4.10
domain
well-defined set

[ISO/TS 19103]

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.

4.11
feature
abstraction of real-world phenomena

[ISO 19101]

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

4.12
feature association
relationship that links instances of one **feature** type with instances of the same or a different **feature** type

[ISO 19110]

NOTE 1   A feature 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   Feature associations include aggregation of features.

4.13
feature attribute
characteristic of a **feature**

[ISO 19101]

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 with it. A feature attribute for a feature instance has an attribute value taken from the domain.

4.14
geographic data
data with implicit or explicit reference to a location relative to the Earth

[ISO 19109]

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

4.15
metadata
data about data

[ISO 19115]

4.16
model
abstraction of some aspects of reality

[ISO 19109]

4.17
portrayal
presentation of information to humans

[ISO 19117]

4.18
quality
totality of characteristics of a product that bear on its ability to satisfy stated and implied needs

[ISO 19101]

4.19
universe of discourse
view of the real or hypothetical world that includes everything of interest

[ISO 19101]

5   Symbols and abbreviated terms

5.1   Abbreviations

This International Standard adopts the following convention for presentation purposes:

UML   Unified Modeling Language.

5.2   UML notation

The diagrams that appear in this International Standard are presented using the Unified Modeling Language (UML) static structure diagram with the basic type definitions from ISO/TS 19103. The UML notations used in this International Standard are described in the Figures 1 and 2.
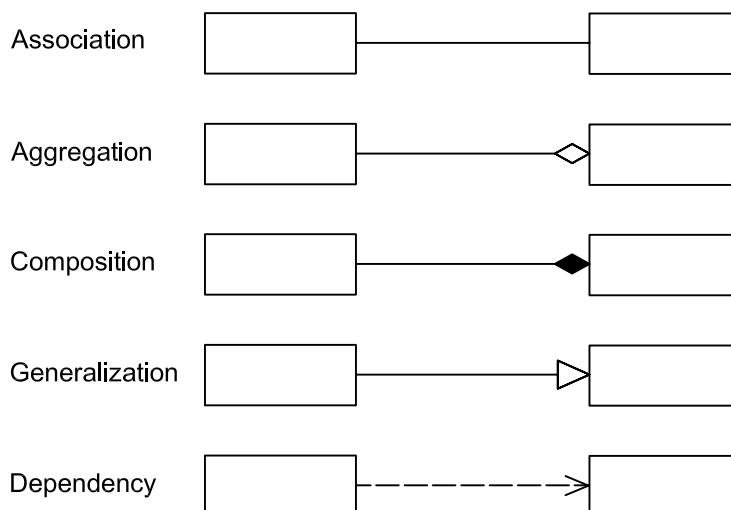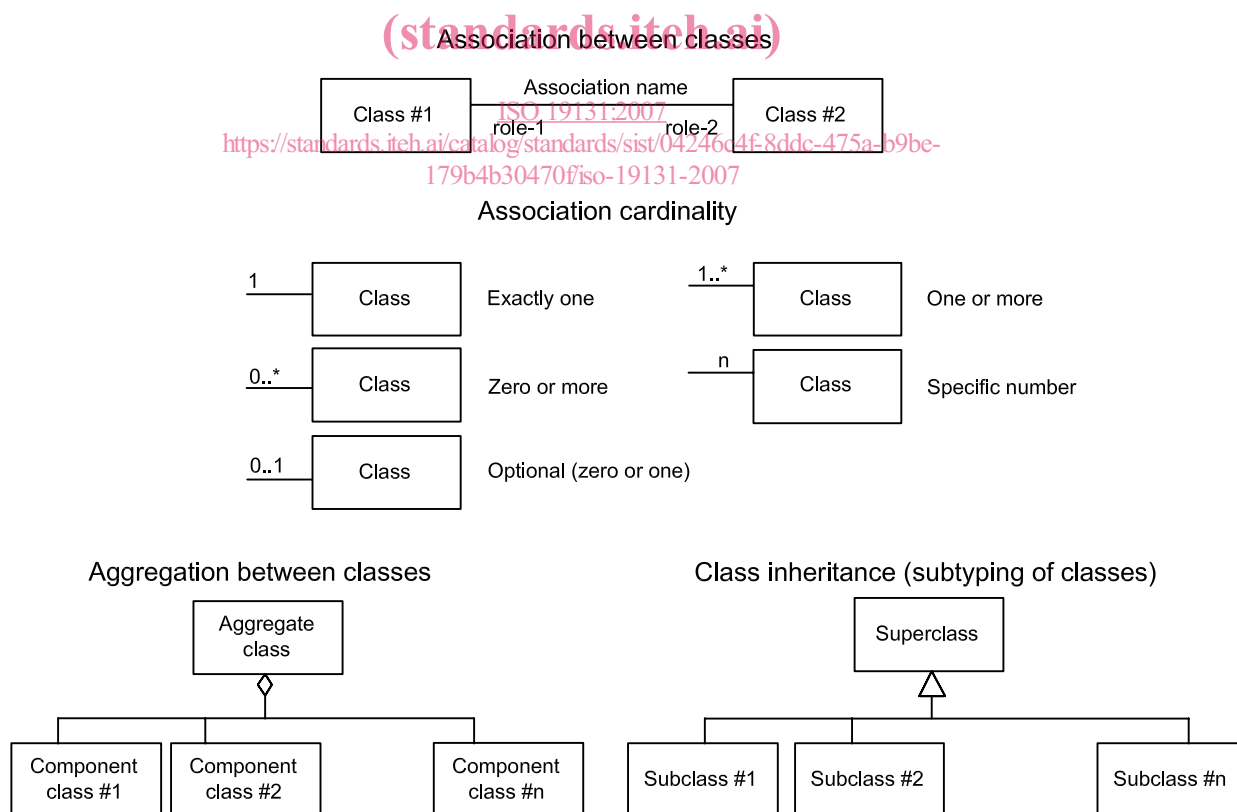
Figure 1 — UML notation

5.3 UML model relationships

If an association is navigable in a particular direction, the model has a "role name" that is appropriate for the role of the target object in relation to the source object. Thus, in a two-way association, two role names will be supplied. Figure 2 represents how role names and cardinalities are expressed in UML diagrams.

NOTE   Where cardinality is not explicitly stated in a diagram, it is assumed to be "exactly one".

Figure 2 — UML roles

5.4   UML model stereotypes

A UML stereotype is an extension mechanism for existing UML concepts. It is a model element that is used to classify (or mark) other UML elements so that they behave in some respect as if they were instances of new virtual or pseudo metamodel classes whose form is based on existing base metamodel classes. Stereotypes augment the classification mechanisms on the basis of the built-in UML metamodel class hierarchy. Below are brief descriptions of the stereotypes used in this International Standard. For more detailed descriptions consult ISO/TS 19103.

In this International Standard the following stereotype is used:

⸺   <<Leaf>> package that contains definitions, without any sub-packages.

5.5   Package abbreviations

Abbreviations are used to denote the package that contains a class. Those abbreviations precede class names, connected by a "_". The International Standard in which those classes are located is indicated in parentheses. A list of those abbreviations follows.

CI   Citation (ISO 19115)

CV   Coverages (ISO 19123)

DPS   Data product specification (this International Standard)

DQ   Data quality (ISO 19115)

EX   Extent (ISO 19115)

FC   Feature catalogue (ISO 19110)

GM   Geometry (ISO 19107)

MD   Metadata (ISO 19115)

TM   Temporal (ISO 19108)

6   General structure and content of a data product specification

A data product specification defines the requirements for a data product. It forms the basis for producing or acquiring data. It may also help potential users to evaluate the data product to determine its fitness for use by them. The information contained in a data product specification is different from that contained in metadata, which provides information about a particular physical dataset. Information from the data product specification may be used in the creation of metadata for a particular dataset that is created in conformance with that data product specification. Thus, metadata describes how a dataset actually is, whilst a data product specification describes how it should be. The requirements for metadata are described in ISO 19115. The relationship between a data product specification and metadata is described more fully in Annex B.

A data product specification shall contain major sections covering the following aspects of the data product:

⸺   Overview — see Clause 7;

⸺   Specification scopes — see Clause 8;

⸺   Data product identification — see Clause 9;

⸺   Data content and structure — see Clause 10;

— Reference systems — see Clause 11;

— Data quality — see Clause 12;

— Data product delivery — see Clause 16;

— Metadata — see Clause 18.

A data product specification may also contain sections covering the following aspects of the data product:

— Data capture — see Clause 13;

— Data maintenance — see Clause 14;

— Portrayal — see Clause 15;

— Additional information — see Clause 17.

Each of these sections of the data product specification is described in the following clauses. Each section, except for the overview (see Clause 7), which is human-readable free text, corresponds to a UML package. These packages are shown in Annex C.

The minimum description of a data product shall contain the mandatory elements within each section (see UML model and corresponding tables in Annexes D and E).

7 Overview

The overview shall include the following parts:

— information about the creation of the data product specification;

NOTE   This may include the title, a reference date, the responsible party, the language and the topic category.

— terms and definitions;

NOTE   This may take the form of a reference to a terminology repository.

— abbreviations;

— the name and any acronyms of the data product;

— an informal description of the data product.

The informal description of the data product shall contain general information about the data product which may include the following aspects:

— the content of the dataset;

— the extent (both spatial and temporal) of the data;

— the specific purpose for which the data shall be or has been collected;

— the data sources and data production processes;

— the maintenance of the data.

NOTE   An informal description is intended to give a short introduction to the data product specification and allow a human reader a better understanding of the specification.