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Geographic information — Metadata —

Part 1: Fundamentals

Information géographique — Métadonnées —

Partie 1: Principes fondamentaux

(Revision of ISO 19115:2003 and ISO 19115:2003/Cor.1:2006)

ICS 35.240.70

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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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 19115-1 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

This second edition cancels and replaces ISO 19115:2003 and ISO 19115:2003/Cor 1:2006.

ISO 19115 consists of the following parts, under the general title *Geographic information — Metadata*:

- *Part 1: Fundamentals*
- *Part 2: Extensions for imagery and gridded data*

Introduction

Recent advancement of computer software and hardware for managing and analysing geospatial data has resulted in a vast increase in the use of digital geographic information and geographic information systems worldwide. The resulting awareness of the importance of geography and how things relate spatially is impacting almost all aspects of society. Increasingly, individuals from a wide range of disciplines outside of geographic information science and information technology are producing, enhancing, and modifying digital geographic information. As the number, complexity, and diversity of geographic information resources grow, a method for providing an understanding of all aspects of these resources grows in importance.

A digital geographic dataset is a representation of some model of the world for use in computer analysis and graphic display of information. The underlying model is an abstraction, requiring approximation, simplification, and omission of some aspects, and is always just one of many possible “views”. To ensure that data are not misused, the assumptions and limitations affecting the creation of data must be fully documented. Typically, data are used by many people other than the producer. Metadata allows a producer to describe resources so that users can understand the assumptions and limitations and evaluate the resources’ applicability for their intended use. Proper documentation will provide those unfamiliar with the data with a better understanding, and enable them to use it properly. Good quality documentation will also provide data producers with a keener knowledge of their holdings and will allow them to better manage data production, storage, updating, and reuse.

A geographic dataset is typically thought of as a structured, tabular data with a location associated with each row in a table or pixel in a grid. For the purposes of the evolving web-based information cloud, the concept of dataset can be usefully extended to include any packaged information product that is intended to be treated as a unit, defined by its scope, authorship, and intended purpose. In this broader view, any document containing geographically located observations or interpretations can be considered a geographic dataset, whether it is structured or unstructured.

The evolving distributed information system enabled by the internet is fostering the development of service-oriented architecture in which web services are becoming important as sources of information or processing capability, and many of these services provide location-based information or functionality. Description of these services for discovery and utilization has become an important function of metadata.

A significant body of geographically located information is contained in resources that may not be in digital form. These resources include maps and documents of various sorts, as well as specimens or other artefacts collected to characterize some aspect of the Earth — physical, biological, or cultural. The metadata schema presented in this International Standard is also applicable to such resources.

The objective of this International Standard is to provide a model for describing geographically located information resources. This International Standard is intended to be used by information system analysts, program planners, and developers of geographic information systems, as well as others in order to define basic principles and requirements for standardized description of geographic information resources. This International Standard defines metadata elements, their properties, and the relationships between elements, and establishes a common set of metadata terminology, definitions, and extension procedures.

Although the primarily purpose of this International Standard is to describe digital geographic information it can be used to describe all types of resources including textual documents, activities, software, non-geographic information, product specifications and repositories.

When implemented by a resource provider, this International Standard will:

- 1) Enable information resource providers to characterize their resources effectively and completely.
- 2) Facilitate the organisation and management of metadata for information resources.

- 3) Enable appropriate use of information resources through accurate understanding of their characteristics.
- 4) Facilitate resource discovery, access, retrieval and reuse.
- 5) Enable users to determine whether an information resource will be of use to them.

This International Standard defines general-purpose metadata. More detailed models for some aspects of resource description, including quality, data-structure or imagery, are defined in other ISO geographic information standards. The model enables implementation of domain-specific user extensions based on a common pattern to facilitate implementation of software using those extensions.

This International Standard is a revision of ISO 19115:2003 and ISO 19115:2006/Cor 1:2005. This revision was driven by advances in Information Technology and a shift toward the use of the Internet for access, use, and management of metadata as well as revisions to reference documents and individual provided suggestions based on 8 years of experience in its use.

This International Standard is fully independent from the previous version with a new name and date. Its UML packages, classes, and elements have different GUIDs from the previous version. The UML from ISO 19115:2003/Cor 1:2006 will remain available in the ISO/TC 211 Harmonized Model Management Group repository. Backward compatibility is to be provided using a transformation service. Past metadata instances may continue to reference/use the previous version.

To aid in ensuring backward compatibility and ease the transformation of metadata instances to this revised International Standard:

- No new mandatory elements were used;
- If the definition of a metadata element required changing it was instead deleted and replaced by a new metadata element; metadata element names were not reused for other concepts;
- Definitions of some metadata elements were broadened;
- Metadata elements were reused when their datatype changed but name and definition remained the same;
- Remaining attributes were kept in the same order as in the replaced standard;
- A list of deleted elements, new elements and a mapping between old elements and their replacement is provided in Annex H;
- Refactoring of the UML was kept to a minimum.

Summary of major changes:

- The concept of “Core metadata” was removed;
- Metadata for services was added, derived from ISO 19119:2005 and ISO/COR 19119:2008;
- Data quality was moved to ISO 19157;
- An annex describing metadata for the discovery of service and non-service resources was added;
- Many codelists were extended;
- The use of “Short name” and “Domain code” was dropped for metadata elements and codes respectively.

A full description of changes is provided in Annex H.

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Geographic information — Metadata —

Part 1: Fundamentals

1 Scope

This International Standard defines the schema required for describing geographic information and services by means of metadata. It provides information about the identification, the extent, the quality, the spatial and temporal aspects, the content, the spatial reference, the portrayal, distribution, and other properties of digital geographic data and services.

This International Standard is applicable to:

- the cataloguing of all types of resources, clearinghouse activities, and the full description of datasets and services;
- geographic services, geographic datasets, dataset series, and individual geographic features and feature properties.

This International Standard defines:

- mandatory and conditional metadata sections, metadata entities, and metadata elements;
- the minimum set of metadata required to serve the full range of metadata applications (data discovery, determining data fitness for use, data access, data transfer, and use of digital data and services);
- optional metadata elements – to allow for a more extensive standard description of resources, if required;
- a method for extending metadata to fit specialized needs.

Though this International Standard is applicable to digital data and services, its principles can be extended to many other types of resources such as maps, charts, and textual documents as well as non-geographic data. Certain conditional metadata elements may not apply to these other forms of data.

2 Conformance

2.1 Conformance requirements

Any metadata claiming conformance with this International Standard shall pass the requirements described in the abstract test suite presented in Annex A

Metadata shall be provided as specified in Clause 6 and Annex B.

If a discrepancy exists between Clause 6 (the UML models) and Annex B, the UML models shall be considered authoritative.

User-defined metadata shall be defined and provided as specified in Annex C.

Any profile conforming to this International Standard shall conform to the rules in C.6.

2.2 Abstract test suite

For the purposes of conformance testing using the abstract test suite in Annex A, metadata classes and elements shall be considered to be mandatory, conditional or optional as specified in the applicable profile.

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 639 (all parts), *Code for the representation of names of languages*

ISO 3166 (all parts), *Codes for the representation of names of countries and their subdivisions*

ISO 4217:2001, *Codes for the representation of currencies and funds*

ISO 8859 (parts 1 to 16), *Information technology — 8 bit single byte coded graphic character sets*

ISO 8601:2004, *Data elements and interchange formats – Information interchange – Representation of dates and times*

ISO 8879, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML)*

ISO/IEC 10646-1:2011, *Information technology — Universal Multiple-Octet Coded Character Set (UCS) — Part 1: Architecture and Basic Multilingual Plane*

ISO 19101:2002, *Geographic information — Reference model*

ISO/TS 19103:2005, *Geographic information — Conceptual schema language*

ISO 19106:2004, *Geographic information — Profiles*

ISO 19107:2003, *Geographic information — Spatial schema*

ISO 19108:2002, *Geographic information — Temporal schema*

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

ISO 19110:2005, *Geographic information — Methodology for feature cataloguing*

ISO 19111:2007, *Geographic information — Spatial referencing by coordinates*

ISO 19111-2:2009, *Geographic information — Spatial referencing by coordinates – Part 2: Extension for parametric values*

ISO 19112:2003, *Geographic information — Spatial referencing by geographic identifiers*

ISO 19115-2:2009, *Geographic information — Metadata – Part 2: Extensions for imagery and gridded data*

ISO 19119:2005 Amd 1: 2008, *Geographic information — Services (this will be updated when new 19119 is produced)*

ISO 19123:2005, *Geographic information — Schema for coverage geometry and functions*

ISO/TS 19139:2007, *Geographic information — Metadata – XML schema implementation*

ISO 19157:—¹⁾, *Geographic information — Data Quality*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The terms and definitions used in conjunction with the UML models are addressed in ISO/TS 19103:2005.

4.1

citation

reference to a book, article or other source

[ISO 12620:1999, B.9]

4.2

data type

specification of a value domain with **operations** allowed on values in this domain

[ISO/TS 19103:2005, 4.1.5]

EXAMPLES Integer, Real, Boolean, String, Date, and GM_Point.

NOTE A data type is identified by a term, e.g. Integer.

4.3

dataset

identifiable collection of data

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.

4.4

dataset series

collection of **datasets** sharing common characteristics

4.5

feature

abstraction of real world phenomena

[19101:2002, 4.11]

4.6

grid

network composed of two or more sets of curves in which the members of each set intersect the members of the other sets in an algorithmic way

[ISO 19123:2005, 4.1.23]

4.7

interface

named set of **operations** that characterizes the behaviour of an entity

[ISO 19119:2005, 4.2]

1) To be published.