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Geographic information — Metadata — Part 1: Fundamentals

Developed by



Where IT all begins



INCITS/ISO 19115-1:2014 [2014]

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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. 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. 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 211, *Geographic information/Geomatics*.

This first edition of ISO 19115-1 cancels and replaces ISO 19115:2003, which has been technically revised. It also incorporates the Technical Corrigendum 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*
- *Part 3: XML schema implementation of metadata fundamentals* [Technical Specification]¹

¹ To be published.

Introduction

Recent advancement of computer software and hardware for managing and analysing data, particularly fusing with geographically referenced observations, has resulted in a vast increase in the use of digital information solutions 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 increases 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 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 architectures 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 information with geographic reference is contained in resources that are not 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 part of ISO 19115 is also applicable to such resources.

The objective of this part of ISO 19115 is to provide a model for describing information or resources that can have geographic extents. This part of ISO 19115 is intended to be used by information system analysts, program planners, and developers of information systems, as well as others in order to define basic principles and requirements for standardized description of information resources. This part of ISO 19115 defines metadata elements, their properties, and the relationships between elements, and establishes a common set of metadata terminology, definitions, and extension procedures.

Although the primary purpose of this part of ISO 19115 is to describe digital information that has a geographic extent, it can be used to describe all types of resources including textual documents, initiatives, software, non-geographic information, product specifications and repositories, i.e. it can be used to describe information resources that do not have geographic extent. Some domains have their

own metadata standards, such as the Dublin Core for libraries. If necessary such standards and this part of ISO 19115 could be profiled to create a Community Schema.

When implemented by a resource provider, this part of ISO 19115 will:

- 1) Enable information resource providers to effectively and completely characterize their resources.
- 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 part of ISO 19115 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 metadata model described herein enables implementation of domain-specific user extensions based on a common pattern to facilitate implementation of software using those extensions.

This part of ISO 19115 is a revision of ISO 19115:2003 and ISO 19115:2003/Cor 1:2006. 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 user provided suggestions based on eight years of experience in its use.

This part of ISO 19115 is fully independent from the previous version with a new name and date. Its UML packages, classes, and elements have different identifiers 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 can continue to reference/use the previous version.

The purpose of metadata is to describe resources. This description may remain with the data and does not change. It can be used both to interpret the data and to search for (discover) the data. Large amounts of older data exists compliant with ISO 19115:2003, and newer data exists (which is still being produced) to national or regional profiles of ISO 19115:2003. This data will remain as it is currently defined. New data production to new product specifications will build upon the revision of ISO 19115 making use of the expanded descriptive capabilities. With the introduction of this revision of ISO 19115, a mixed data environment exists. Systems that support data discovery in compliance with the revision of ISO 19115 need to also be able to also recognize and interpret metadata in the ISO 19115:2003 form so that all data in a mixed environment can be discovered. Systems that support data interpretation in compliance with the revision of ISO 19115 need to also be able to also recognize and interpret metadata in the ISO 19115:2003 form so that all data is interpreted. The use of separate identifiers for the revised elements and the manner in which the metadata standard has been revised facilitates this.

To aid in ensuring backward compatibility and ease the transformation of metadata instances to this revised version of ISO 19115:

- No new mandatory elements were created;
- If the definition of a metadata element required changing it was deleted and replaced by a new metadata element; metadata element names were not reused for other concepts;

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- 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 G;
- Restructuring 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 19119:2005/Amd 1:2008;
- Data quality was moved to ISO 19157;
- Annex F was added to describe metadata for the discovery of service and non-service resources;
- 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 G.

Geographic information — Metadata — Part 1: Fundamentals

1 Scope

This part of ISO 19115 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 part of ISO 19115 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 part of ISO 19115 defines:

- mandatory and conditional metadata sections, metadata entities, and metadata elements;
- the minimum set of metadata required to serve most 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 part of ISO 19115 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 might not apply to these other forms of data.

2 Conformance

2.1 Conformance requirements

Any metadata claiming conformance with this part of ISO 19115 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 the UML models provided in Clause 6 and Annex B, the UML models shall be considered authoritative.

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