



SLOVENSKI STANDARD
oSIST prEN ISO 19115-3:2022
01-april-2022

Geografske informacije - Metapodatki - 3. del: Izvajanje sheme XML za temeljne koncepte (ISO/DIS 19115-3:2022)

Geographic information - Metadata - Part 3: XML schema implementation for fundamental concepts (ISO/DIS 19115-3:2022)

Geoinformation - Metadaten - Teil 3: XML Implementierungsschema für Metadaten-Grundsätze (ISO/DIS 19115-3:2022)

Information géographique - Métadonnées - Partie 3 : Mise en oeuvre par des schémas XML (ISO/DIS 19115-3:2022)

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Part 3: XML schema implementation for fundamental concepts

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 19115-3:2016), which has been technically revised.

The main changes are as follows: <https://standards.iteh.ai/catalog/standards/sist/033a0e71-162-40fe-85cb-5b93c928c3c3/osist-pren-iso-19115-3-2022>

- Update references to external standards:
 - especially from ISO 19139:2007 to ISO 19139-1:2019 XML Implementation.
 - Reallocating components to the relevant primary standards especially for ISO 19115-1:2014, ISO 19115-2:2019 and ISO 19103:2015.
 - Removal of additional Packages and namespaces that are derived by the aggregation of packages defined in ISO 19115-1 and ISO 19115-2.
 - Consolidation of tables to:
 - reduce repetition of information;
 - collocate information about requirements, conformance tests and clauses they refer to.
 - Reordering of elements in the XML schemas for ISO 19115-1 and ISO 19115-2 has been undertaken to align with the order of attributes in the associated data dictionaries. Appropriate XML style sheets (XSLT) have been generated to assist in transformation XML records from records conforming to previous versions of the schemas. The conceptual models in the HMMG have been augmented to include the attribute ordering as set out in the data dictionaries in ISO 19115-1:2014 plus amendments 1 and 2 and ISO 19115-2:2019.

A list of all parts in the ISO 19115 series can be found on the ISO website.

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

ISO 19115-1 explains the importance of metadata, specifies a model for describing geographic information resources by defining metadata entities, elements and terminology, and establishing an extension procedure for additional metadata content. ISO 19115-1:2014, Annex G describes the revisions from ISO 19115:2003. The revised content model also incorporates metadata elements defined in ISO 19119:2005 and ISO 19119:2005/Amd 1:2008 for metadata describing web services. More detailed metadata for geographic data types and data quality are defined in other ISO geographic information standards (e.g. ISO 19110 and ISO 19157). Where necessary, interpretations of some other ISO geographic information standards are incorporated for this implementation.

ISO 19115-2 extends ISO 19115-1 by adding models for acquisition information and extending the models for metadata (MD_Metadata), data quality (DQ_DataQuality, now in ISO 19157), spatial representation (MD_SpatialRepresentation), and content information (MD_ContentInformation).

ISO 19115-1 and ISO 19115-2 define conceptual models for metadata content that are independent of any particular encoding scheme. ISO/TS 19139-1 defines encoding rules for the generation of eXtensible Markup Language (XML) schemas to encode that content. This document defines XML encodings for ISO 19115-1 and ISO 19115-2 metadata content. The integratable schemas makes it possible to use concepts from ISO 19115-1 and ISO 19115-2 together in metadata instance documents enabling automated validation of ISO 19115-1 and ISO 19115-2 metadata content using standard software tools.

The integrated schemas have been derived from ISO 19115-1 and ISO 19115-2 conceptual models using the rules defined in ISO/TS 19139-1:2019 applied to an adapted implementation-ready UML version of the conceptual models as described in Clause 8. The implementation approach enables modularization and eases reuse of elements of the conceptual models. Abstract classes were added to the ISO geographic information harmonized model, without altering the semantics, to create an implementation model that was used for this XML implementation (see Clause 8 for details).

The primary use case envisioned for this XML implementation is the exchange of geographic metadata in a client-server environment exemplified by the World Wide Web, in which the internal management and structure of metadata content is independent of the encoding used for exchange of metadata information. Adoption of this geographic metadata XML schema within an information-sharing community will garner the benefits of standardization for resource discovery, access, use, and understanding.

Geographic information — Metadata —

Part 3: XML schema implementation for fundamental concepts

1 Scope

This document defines an integrated XML implementation of ISO 19115-1 and ISO 19115-2 by defining the following artefacts:

- a) a set of XML schema required to validate metadata instance documents conforming to conceptual model elements defined in ISO 19115-1 and ISO 19115-2; and
- b) a set of ISO/IEC 19757-3 (Schematron) rules that implement validation constraints in the ISO 19115-1 and ISO 19115-2 UML models that are not validated by the XML schema.

This document describes the procedure used to generate XML schemas from ISO geographic information conceptual models related to metadata. The XML schemas are generated directly from the conceptual UML model ([Clause 6.2](#)).

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.

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 ISO 20##, *General title* — Part ##: Title of part

ISO 19103:2015, *Geographic information — Conceptual schema language*

ISO 19110:2016, *Geographic information — Methodology for feature cataloguing*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19115-2:2019, *Geographic information — Metadata — Part 2: Extensions for acquisition and processing*

ISO 19115-2:2019, *Geographic information — Metadata — Part 2: Extensions for acquisition and processing*

ISO 19136-1:2020, *Geographic information — Geography Markup Language (GML) — Part 1: Fundamentals*

ISO 19157:2013, *Geographic information — Data quality*

ISO/TS 19139-1:2019, *Geographic information — XML schema implementation — Part 1: Encoding rules*

3 Terms and definitions

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

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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 namespace

<XML> collection of names, identified by a URI reference, which are used in XML documents as element names and attribute names

Note 1 to entry: The combination of a namespace URI and element or attribute name are intended to be a globally unique identifier for that model element.

[SOURCE: W3C XML Namespaces:1999]

3.2 package

<UML> general purpose mechanism for organizing elements into groups

EXAMPLE Identification information package, metadata entity set information package, constraint information package.

Note 1 to entry: Packages may be nested within other packages. Both model elements and diagrams may appear in a package.

Note 2 to entry: A package provides a namespace for the grouped elements.

[SOURCE: ISO 19103:2015, 4.27, modified — Examples and notes to entry have been added.]

3.3 polymorphism

characteristic of being able to assign a different meaning or usage to something in different contexts – specifically, to allow an entity such as a variable, a function, or an object to have more than one form

Note 1 to entry: There are several different kinds of polymorphism.

[SOURCE: ISO/TS 19139-1:2019, 3.3]

3.4 realization

<UML> specialized abstraction relationship between two sets of model elements, one representing a specification (the supplier) and the other representing an implementation of the latter (the client).

Note 1 to entry: Realization indicates inheritance of behaviour without inheritance of structure.

[SOURCE: UML 2]

4 Symbols and abbreviated terms

4.1 Acronyms

GML	Geography Markup Language
HTML	HyperText Markup Language
UML	Unified Modeling Language
URI	Universal Resource Identifier
URL	Universal Resource Locator

XML	Extensible Markup Language
XPath	XML Path Language
XSD	XML Schema Definition
XSL	Extensible Style Language
XSLT	Extensible Stylesheet Language Transformation

4.2 Namespaces

XML namespaces defined in this document are identified by URIs that follow the pattern:

- <https://schemas.isotc211.org/sn/-j/xxx/N.n>, where sn is the ISO standard number, j is the part number, xxx is a three-alphanumeric-character namespace abbreviation, and N is the edition number and n is the version number (starting at 1). Dereferencing the namespace URI as a resource locator will retrieve a description of the namespace, links to description of the content of the namespace, and links to the base specification the namespace implements and to the normative XML schema location.

Because the full URI is cumbersome for reading, writing, and in human discussion, this document will refer to the namespaces using abbreviations. Table 1 lists namespaces from other specifications imported by this implementation. Table 3 (Clause 5.2) lists abbreviations and other information for namespaces used for UML packages defined in ISO 19115-1 and ISO 19115-2. Table 4 (Clause 5.3) lists information for namespaces defined in this document that import multiple XML namespaces to define interchange document types.

Table 1 — External namespace URIs and namespace abbreviation conventions used in this document

Data Quality classes	
UML Package	From ISO 19157
Namespace name	Data quality common
Namespace abbreviation	dqc
Namespace URI	https://schemas.isotc211.org/19157/-2/dqc/1.1
Feature Catalogue classes	
UML Package	From ISO 19110
Namespace name	Feature catalogue common
Namespace abbreviation	fcc
Namespace URI	https://schemas.isotc211.org/19110/-/fcc/2.1
General Feature classes	
UML Package	From ISO 19110
Namespace name	Feature catalogue common
Namespace abbreviation	gfc
Namespace URI	https://schemas.isotc211.org/19110/-/gfc/2.1
Geography Markup Language (GML) classes	
UML Package	From GML
Namespace name	Geography markup language

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UML Package	From ISO 19157
Namespace abbreviation	gml
Namespace URI	http://www.opengis.net/gml/3.2

XML Linking	
UML Package	From W3C
Namespace name	XML linking language
Namespace abbreviation	xlink
Namespace URI	http://www.w3.org/1999/xlink

Schema Definition classes	
UML Package	From W3C
Namespace name	W3C XML schema definition schema
Namespace abbreviation	Xs
Namespace URI	http://www.w3.org/2001/XMLSchema

Geospatial Common Type classes	
UML Package	From ISO 19103
Namespace name	Geospatial Common Objects
Namespace abbreviation	gco
Namespace URI	https://schemas.isotc211.org/19103/-/gco/1.2

Geospatial Common Extended Type classes	
UML Package	From ISO 19103
Namespace name	Geospatial Common objects extended
Namespace abbreviation	gcx
Namespace URI	https://schemas.isotc211.org/19103/-/gcx/1.2

Geography Markup Language Wrapper classes	
UML Package	From ISO 19136-1
Namespace name	GML wrapper
Scope	Namespace that implements properties with values specified by GML classes
Namespace abbreviation	gmw
Namespace URI	https://schemas.isotc211.org/19136/-1/gmw/1.1

5 Conformance

5.1 General

This document defines a mechanism by which an XML implementation can demonstrate conformance to requirements in ISO 19115-1:2014¹⁾ and ISO 19115-2:2019²⁾. Neither of those standards explicitly define requirements classes or specification targets. Each describes conformance requirements and allows for “user-defined metadata” and “profiles”. Implicitly, this gives four requirements “super

1) Including Amendment 1:2018 and Amendment 2:2020

2) Including Amendment 1:2020

classes” and three specification targets. ISO 19115-1 and ISO 19115-2 do not assign identifiers for these requirements classes; in this document, these identifiers are used:³⁾

Table 2 — ISO 19115-1 and ISO 19115-2 conformance classes without URIs

Conformance class		Specification target	Dependency	
	Identifier			
ISO 19115-1 “base”	https://standards.iso.org/~iso19115/-1/1/clause#6	Metadata instance		
ISO 19115-1 “user-defined extension”	https://standards.iso.org/~iso19115/-1/1/clause#C.4	Metadata instance	https://standards.iso.org/~iso19115/-1/1/clause#6	Re-used by reference in 19115-2
ISO 19115-2 “acquisition base”	https://standards.iso.org/~iso19115/-2/1/clause#5.1	Metadata instance	https://standards.iso.org/~iso19115/-1/1/clause#6	
ISO 19115-1 “profile”	https://standards.iso.org/~iso19115/-1/1/clause#C.6	Metadata specification (community, or other ISO/TC 211 standard) or “information exchange” document	https://standards.iso.org/~iso19115/-1/1/clause#6 Optionally: https://standards.iso.org/~iso19115/-1/1/clause#C.4 Optionally: https://standards.iso.org/~iso19115/-2/1/clause#5.1	Re-used by reference in 19115-2

NOTE “profile” includes importing e.g. citation into another ISO/TC 211 standard.

In order to conform to ISO 19115-1 or 19115-2, a metadata instance conforms to <https://standards.iso.org/iso19115/-1/1/clause#2.1.core> and may conform to <https://standards.iso.org/iso19115/-1/1/clause#2.1.user-defined> and / or <https://standards.iso.org/iso19115/-2/1/clause#5.1>. This document describes how an XML encoded metadata instance can be shown to conform to those requirements.

Where a community profile constrains ISO 19115, an XML implementation schema may import some modules from this document or may test those constraints using additional community-specific Schematron rules. Where a community extends ISO 19115, it follows the rules in ISO 19115-1 Clause C.6; the extensions should follow the rules in ISO 19115-1 Clause C.4. An XML implementation schema should be generated that conforms to ISO 19139-1, in the same way that this document does.

Because of the modular nature of ISO 19115-1 and ISO 19115-2, each requirements “super class” contains optional packages and elements. The overall requirements is that the metadata be provided as specified. The actual requirements classes correspond to the clauses in the document and the packages in the UML model. Following ISO 19139-1, each UML package results in a separate XML namespace.

This document lists 22 requirements classes for “metadata modules”, and seven for “metadata interchange documents”.

ISO 19115-1 and ISO 19115-2 provide Abstract Test Suites; this document provides XML schema documents and Schematron rules to facilitate an Executable Test Suite implementing those Abstract Test Suites in the context of an XML implementation. In order to satisfy the one requirement of this document, an XML instance need only validate against the XML schema and Schematron rules, as described in [Annex A](#).

Some of the requirements of ISO 19115-1 and ISO 19115-2 cannot be validated in this way; these are listed in [clause A.2.4.4](#). Other automatic or manual validation would be required for these requirements of parts 1 and 2.

Implementers may choose to define other “information exchange” document schemas that import normative XML schemas in addition to those specified here to identify and use them to validate interchange documents. The design of these schemas will be contingent on the requirements of the

3) To be adjusted to the pattern HMMG confirm, which may be lodged as a comment to ISO/DIS 19105.

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user community for the particular information exchange. These information exchange schema should be documented in a technical note.

5.2 Conformance classes for metadata modules

This document defines a set of XML schema and conformance classes for various content modules defined by ISO 19115-1 and ISO 19115-2 to allow these to be used as components in other interchange document implementations. Each module is packaged in a separate XML namespace. [Tables 3](#) lists the module defined in this document.

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Table 3 — Namespace URIs and namespace abbreviation used in this document for packages defined in ISO 19115-1 and ISO 19115-2 and conformance classes defined for metadata modules associated with those packages

Metadata Application classes	
Source	ISO 19115-1:2014 Clause 6.2
UML Package	Metadata application information
Namespace name	MetaData Application
Scope	Includes classes for describing resource collections with hierarchical metadata.
Namespace abbreviation	mda
Namespace URI	https://schemas.isotc211.org/19115/-1/mda/1.3
Conformance class URI	https://standards.iso.org/iso19115/-1/1/conf/metadata-application-instance
Conformance class name	Valid XML instance of metadata application namespace

Metadata Base classes	
Source	ISO 19115-1:2014 Clause 6.5.2
UML Package	Metadata information
Namespace name	MetaData Base
Scope	Define metadata root element and properties, with abstract implementation. This namespace is intended to support profile development.
Namespace abbreviation	mdb
Namespace URI	https://schemas.isotc211.org/19115/-1/mdb/1.3
Conformance class URI	https://standards.iso.org/iso19115/-1/1/conf/metadata-base-xml
Conformance class name	Valid XML instance of metadata base namespace

Resource Identification classes	
Source	ISO 19115-1:2014 Clause 6.5.3
UML Package	Identification information
Namespace name	Metadata for Resource Identification
Scope	Descriptive information about the resource
Namespace abbreviation	mri
Namespace URI	https://schemas.isotc211.org/19115/-1/mri/1.3
Conformance class URI	https://standards.iso.org/iso19115/-1/1/conf/resource-identification-xml
Conformance class name	Valid XML instance of resource identification namespace