

AS/NZS ISO 19115.3:2023
ISO 19115-3:2023



Australian/New Zealand Standard™

Geographic information — Metadata

Part 3: XML schema implementation for fundamental concepts



AS/NZS ISO 19115.3:2023

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Australian/New Zealand Standard™

Geographic information — Metadata

Part 3: XML schema implementation for fundamental concepts

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT-004, Geographical Information/Geomatics, to supersede SA TS ISO 19115.3:2018.

The objective of this document is to specify requirements for 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 (8.5).

This document defines an integrated XML implementation of AS/NZS ISO 19115.1 and AS/NZS ISO 19115.2 by defining the following:

- (a) A set of XML schema required to validate metadata instance documents conforming to conceptual model elements defined in AS/NZS ISO 19115.1 and AS/NZS ISO 19115.2.
- (b) A set of ISO/IEC 19757-3 (Schematron) rules that implement validation constraints in the AS/NZS ISO 19115.1 and AS/NZS ISO 19115.2 UML models that are not validated by the XML schema.

This document is identical with, and has been reproduced from, ISO 19115-3:2023, *Geographic information — Metadata — Part 3: XML schema implementation for fundamental concepts*.

As this document has been reproduced from an International document, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

The main changes are as follows:

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.

Introduction

0.1 Metadata models for geographic information resources

ISO 19115-1 and ISO 19115-2 collectively provide conceptual models that describe geographic information resources. These models represent metadata of geographic information resources.

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. It also incorporates metadata elements describing web services defined in ISO 19119:2005¹⁾ and ISO 19119:2005/Amd 1:2008²⁾, where those elements are no longer included in ISO 19119:2016 as they have been supplanted by more detailed metadata elements for geographic data types and data quality defined in other ISO geographic information standards (e.g. ISO 19110:2016 and ISO 19157:2013).

NOTE ISO 19115-1:2014, Annex G describes the revisions from ISO 19115:2003³⁾.

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 19157:2013), spatial representation (MD_SpatialRepresentation), and content information (MD_ContentInformation).

0.2 XML encoding of metadata models

As ISO 19115-1 and ISO 19115-2 define conceptual models for metadata content, these models are independent of any particular encoding scheme. To use these models in XML requires the development of an XML encoding that implements the conceptual models.

In the past, ISO 19115:2003, the predecessor of ISO 19115-1 and ISO 19115-2, has been provided with an XML encoding defined by ISO/TS 19139:2007⁴⁾ and ISO/TS 19139-2:2012⁵⁾, called “gmd”.

With the advent of ISO 19115-1 and ISO 19115-2, a new XML encoding is needed. This document fulfils that role by providing integrated XML schemas for ISO 19115-1 and ISO 19115-2 metadata content, effectively replacing ISO/TS 19139:2007 and ISO/TS 19139-2:2012.

0.3 Integrated schemas

The integrated schemas provided by this document make it possible to use concepts from ISO 19115-1:2014 and ISO 19115-2:2019 together in metadata instance documents, and enable automated validation and interchange of 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 10](#). 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 10](#) for details).

0.4 Intent and usage

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

1) Cancelled and replaced by ISO 19119:2016.

2) Cancelled and replaced by ISO 19119:2016.

3) Cancelled and replaced by ISO 19115-1:2014.

4) Cancelled and replaced by ISO/TS 19139-1:2019.

5) Withdrawn.

and structure of metadata content is independent of the encoding used for the 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.

NOTES

Australian/New Zealand Standard

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:

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 (8.5).

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 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/Amd 1:2018, *Geographic information — Metadata — Part 1: Fundamentals — Amendment 1*

ISO 19115-1:2014/Amd 2:2020, *Geographic information — Metadata — Part 1: Fundamentals — Amendment 2*

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

3 Terms, definitions and abbreviated terms

3.1 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:

3.1.1

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.

Note 2 to entry: See Reference [18].

3.1.2

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* (3.1.1) for the grouped elements.

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

3.1.3

polymorphism

capability of expression in alternative forms that also allows extensions to semantics, structure and behaviour

Note 1 to entry: Polymorphism is commonly applied to data in order to support different usages and contexts.

3.2 Abbreviated terms

GML	Geography Markup Language
HTML	HyperText Markup Language
MA	maintenance agency
UML	Unified Modeling Language
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
XML	Extensible Markup Language
XPath	XML Path Language
XSD	XML Schema Definition
XSL	Extensible Style Language
XSLT	Extensible Stylesheet Language Transformation

4 Conventions

4.1 Availability of ISO/TC 211 resources

4.1.1 Maintenance agency for ISO/TC 211 resources

ISO/TC 211 harmonized resources are resources published by ISO/TC 211 with the intention of assisting developers, implementers and users of ISO/TC 211 standards, including UML models, XML schemas and ontologies.

Such resources, including those provided by this document, are managed by a maintenance agency. The name and contact information of the maintenance agency for this document can be found at www.iso.org/maintenance_agencies.

4.1.2 Resources provided by this document

This document provides the following types of ISO/TC 211 harmonized resources:

4.2 Presentation of ISO/TC 211 resources

4.2.1 General

Conformance to ISO/TC 211 documents depends on the satisfaction of all mandatory provision classes and conformance classes provided in the document.

This clause describes how these information resources are presented in this document.

4.2.2 Provision classes and provisions

Provision classes are collections of provisions grouped together according to a common theme or a coherent need, such as for the implementation of a particular feature.

Provision classes can be mandatory or optional if explicitly specified.

A provision class is rendered as shown in [Table 1](#).

NOTE The title of a table denotes the number and title of the provision class, for example: Requirements class 1: Metadata core (ISO 19115-1).

Table 1 — Example 1: Requirement class X: Example title

Identifier	<i>The ISO/TC 211 URI of the provision class.</i>
Implements	<i>Any provision class that this provision is an implementation of.</i>
Target type	<i>Type of subject of which the provision class applies.</i>
Prerequisites	<i>List of provision classes that this provision class depends on.</i>
Included in	<i>List of provision classes that this provision class is included in.</i>
Provisions	<i>List of provisions contained in this provision class.</i>
Description	<i>The description of the provision class.</i>
Guidance	<i>Informative information provided as guidance for implementation.</i>

Provisions are statements that describe conformance conditions for this document.

The following types of provision are specified in ISO/TC 211 documents:

A provision is rendered as shown in [Table 2](#).

NOTE The table title denotes the number and title of the provision, for example: Requirement 104: Character set code from IANA charset register.

Table 2 — Example 2: Requirement X: Example title

Identifier	<i>The ISO/TC 211 URI of the provision.</i>
Target type	<i>Type of subject for which the provision applies.</i>
Implements	<i>Any provision of which this provision is an implementation.</i>
Prerequisites	<i>List of provisions on which this provision depends.</i>
Included in	<i>List of provision classes in which this provision is included.</i>
Statement	<i>The statement to be satisfied.</i>
Guidance	<i>Informative information provided as guidance for implementation.</i>

4.2.3 Conformance classes and conformance tests

Satisfaction of ISO/TC 211 provision classes and provisions is determined by the validation of corresponding conformance classes and conformance tests.

A conformance class contains at least one conformance test that validates a target meeting all provisions described in a provision class.

A conformance class is rendered as shown in [Table 3](#).

NOTE The table title denotes the number and title of the conformance class, for example: Conformance class A.1: Metadata core (ISO 19115-1).

Table 3 — Example 3: Conformance class X: Example title

Identifier	<i>The ISO/TC 211 URI of the conformance class.</i>
Target type	<i>Type of subject for which the conformance class applies.</i>
Satisfies	<i>List of requirements classes that this conformance class satisfies.</i>
Prerequisites	<i>List of conformance classes on which this conformance class depends..</i>
Included in	<i>List of conformance classes in which this conformance class is included.</i>
Includes	<i>List of conformance tests contained in this conformance class.</i>
Description	<i>The description of the conformance class.</i>
Guidance	<i>Informative information provided as guidance for testing.</i>

A conformance test provides test methods that validate a target meeting at least one provision.

A conformance test is rendered as shown in [Table 4](#).

NOTE The table title denotes the number and title of the conformance test for example: Conformance test A.25: Valid root class of the metadata minimal instance.

Table 4 — Example 4: Conformance test X: Example title

Identifier	<i>The ISO/TC 211 URI of the conformance test.</i>
Target type	<i>Type of subject for which the conformance test applies.</i>
Satisfies	<i>List of requirements that this conformance test satisfies.</i>
Prerequisites	<i>List of conformance tests on which this conformance test depends.</i>
Included in	<i>List of conformance classes in which this conformance test is included.</i>
Test purpose	<i>The purpose of this conformance test.</i>
Test method	<i>The method and steps for executing this conformance test.</i>
Test type	(Optional) <i>The type of conformance test.</i>
Guidance	<i>Informative information provided as guidance for testing.</i>

4.3 Structure of URIs in ISO/TC 211 resources for implementation

4.3.1 General

The implementation of ISO/TC 211 documents requires the provision of access to official and unique identification of resources provided by those documents.

ISO/TC 211 defines a set of rules for constructing URIs to be used in all documents published by ISO/TC 211. These rules are approved documented in Reference [28].

4.3.2 Identified resources

The following types of resources provided in this document are assigned unique and persistent identifiers:

The relevant URI structures are reproduced in the following subclauses for reference.

4.3.3 Basic elements used in URI templates

Elements used in URI templates include:

<code>standardNumber</code>	The main document number of the International Standard. EXAMPLE 1 19115 for a document in the ISO 19115 series.
<code>partNumber</code>	For a series with several parts. If there are no additional parts, the string – is used. EXAMPLE 2 –3 for part 3.
<code>editionNumber</code>	Official ISO edition number. EXAMPLE 3 1 for edition 1.

4.3.4 XML schema namespace and location

URI template for XML namespace:

URL template for XML schema location:

where:

<code>namespace</code>	is the XML namespace prefix for the schema; EXAMPLE 1 <code>mda</code> for the XML namespace for metadata application.
<code>majorSchemaReleaseNo</code>	is the major schema release number of the schema, which changes if a new a namespace is used;
<code>minorSchemaRevisionNo</code>	is the minor schema revision number of the schema, which is added to the schema location to enable minor fixes while keeping the namespace stable.

NOTE 1 Refer to [4.3.3](#) for an explanation of the basic elements in the URI template.

NOTE 2 The edition number is appended to the end of the template to facilitate upgrading in implementations.

EXAMPLE 2 The namespace prefix and schema location for the `mcc` namespace of ISO 19115-1, edition 1, major schema release number 3, minor schema revision number 0 is represented by:

Dereferencing the namespace URI as a resource locator (as a URL) 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.

As the full URI is cumbersome for reading, writing, and in human discussion, the common prefix of the URI is typically omitted. However, since this document involves URIs spanning multiple documents, the usage of the full URI for clarity is preferred when used in this document.

4.3.5 Normative statements

URI template for normative statement class:

URI template for normative statement:

where:

<code>statementType</code>	is the type of the normative statement, which is one of <code>req</code> (requirement), <code>rec</code> (recommendation) or <code>per</code> (permission);
<code>nsClassId</code>	is the internal identifier of the normative statement class;

`nsID` is the internal identifier for the normative statement within the normative statement class.

NOTE 1 Refer to [4.3.3](#) for an explanation of the basic elements in the URI template.

NOTE 2 The edition number of the document is placed before the statement type to enable there to be one main URI for all statements in one edition. The statements are expected to require inspection for each edition.

EXAMPLE The URI for requirement `extent` in the requirement class `content` in ISO 19131 (edition 2) is identified by the URI:

4.3.6 Conformance classes and tests

URI template for conformance class:

URI template for conformance test:

where:

`classId` is the internal identifier of the conformance class;

`testID` is the internal identifier for the conformance test within the conformance class.

NOTE 1 Refer to [4.3.3](#) for an explanation of the basic elements in the URI template.

NOTE 2 The edition number of the document is placed before "conf" to enable there to be one main URI for all conformance classes in one edition. The tests are expected to require inspection for each edition.

EXAMPLE The URI for the conformance test `allContent` in the conformance class `content` in ISO 19131 (edition 2) is identified by the URI:

4.4 Presentation of information resources in this document

4.4.1 General

This document provides descriptions of multiple types of information resources from different sources, including:

The following subclauses describe how these information resources relate to each other as provided in this document.

4.4.2 Relations between information resources

The types of information resources provided in this document and their relationships are described in [Figure 1](#).

In particular, there are two planes of concerns shown in [Figure 1](#):

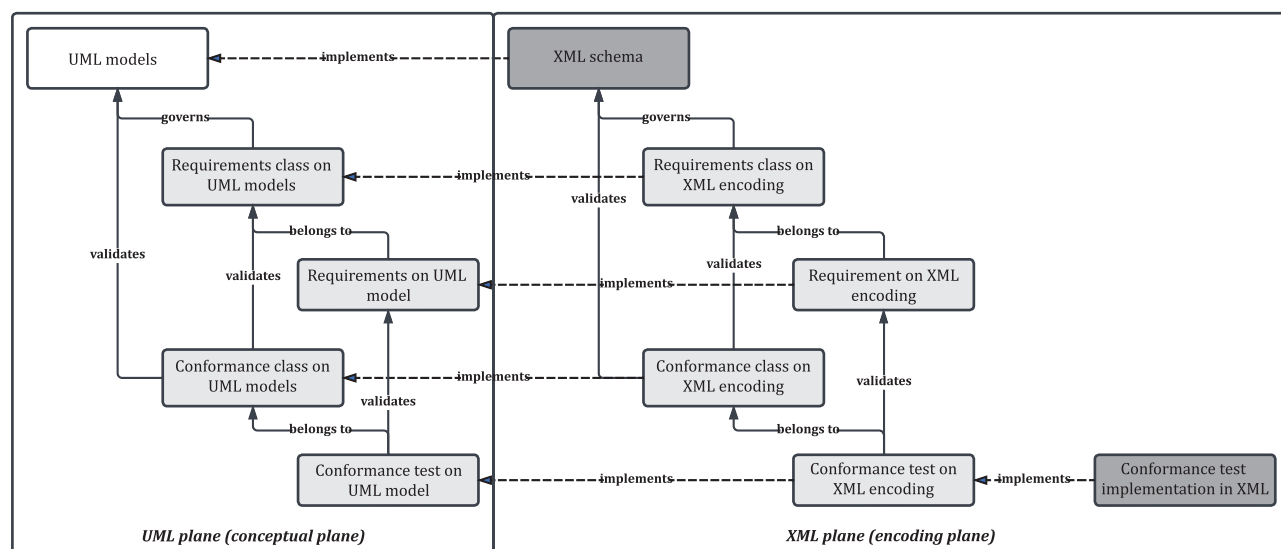
In this document:

An XML schema is said to implement an UML model when it performs in the same way logically according to the requirements set by the UML model, while enabling the encoding of data into XML documents.

The proper usage of the UML models and XML schemas are governed by the normative statements classes and conformance classes that apply to those UML models or XML schemas.

There is a close relationship between the UML plane and the XML plane. Notably, the XML plane has to at least satisfy all requirements described in the UML plane:

Finally, this document also references machine-executable tests (see [Annex A](#)) that implement some conformance tests at the XML plane, which can be seen at the bottom right corner of the [Figure 1](#).



Key

- platform-independent models
- platform-specific models
- requirements scheme instances

Figure 1 — Types of information resources described in this document and their relationships

4.4.3 Location of information resources

Certain information resources referenced by this document are managed by a maintenance agency and exist externally.

[Figure 2](#) indicates the location of information resources, whether they are located in this document or managed by the maintenance agency.

[Figure 2](#) is developed on top of [Figure 1](#), which only indicates abstract concepts (such as “XML schemas”), to provide realized information as relating to content described by the current document (such as “XML schemas provided as ISO/TC 211 resources”).

Resources managed by the maintenance agency can be accessed at the corresponding location described at [4.1.1](#).

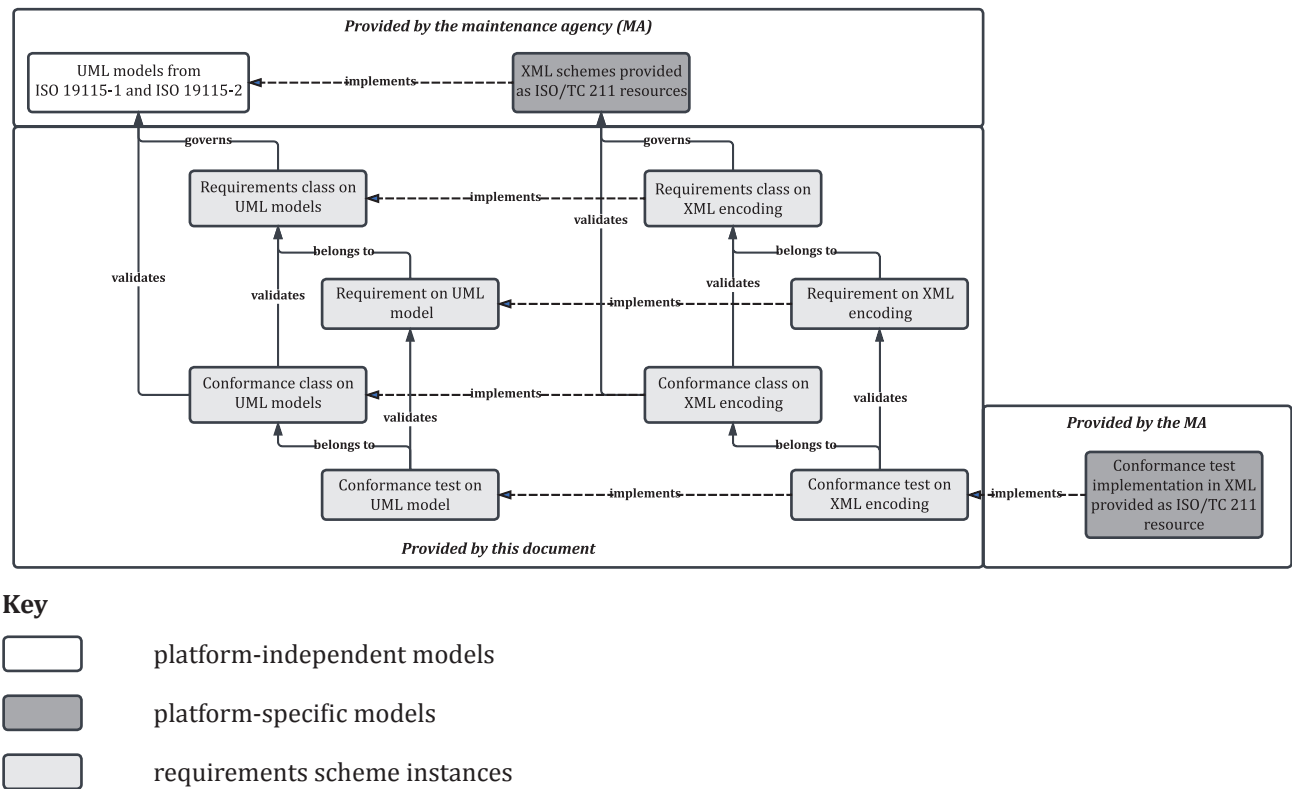


Figure 2 — Location of information resources described in this document

5 XML schemas

5.1 General

XML schemas described in this document are identified by their namespace prefixes and URIs that follow the pattern described in 4.3.4.

This document provides XML schema information relevant to its implementation in the following subclauses:

For every listed XML schema (as identified by a single namespace prefix), the following information is provided.

The relationships between the XML schema and associated information are detailed in Figure 3.

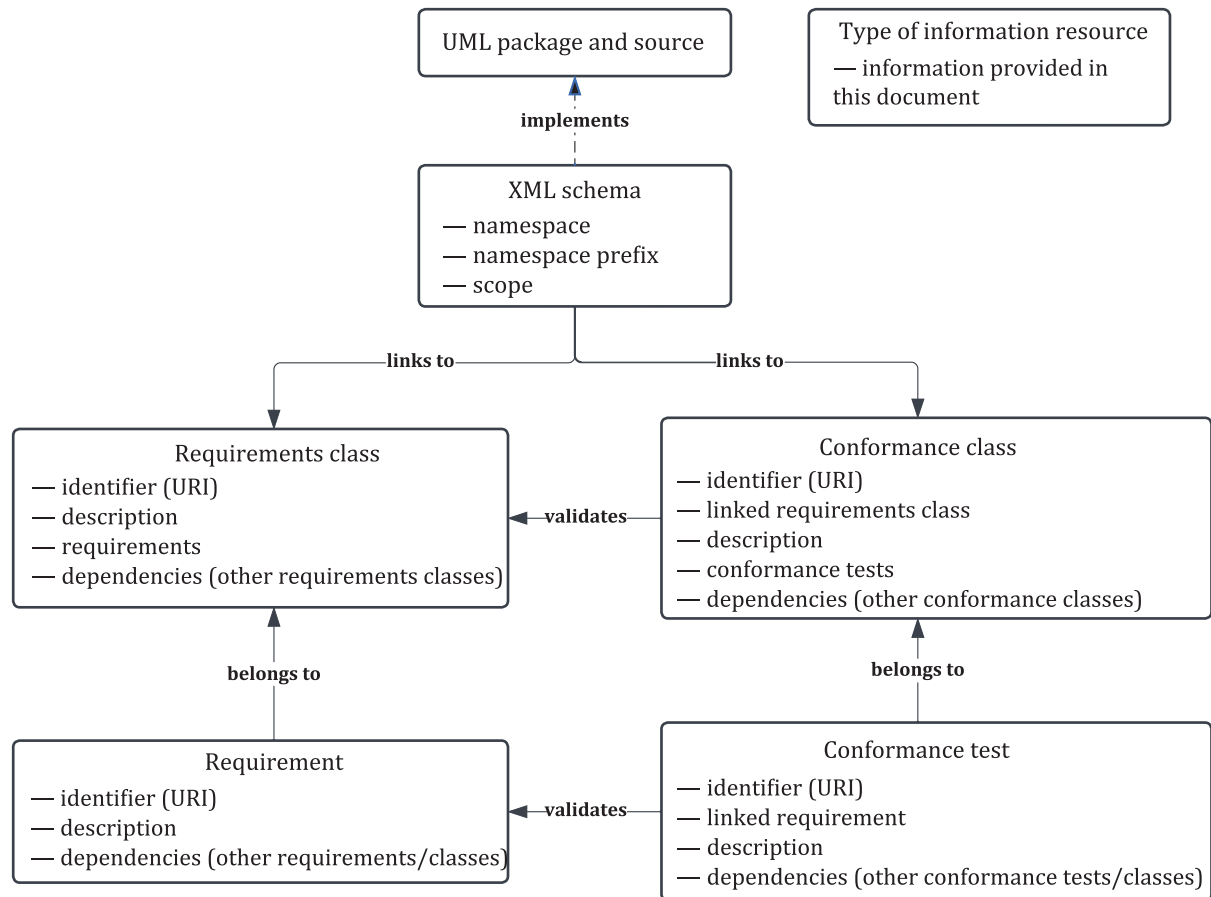


Figure 3 — Overview of XML schemas and their associated information

NOTE 1 XML schemas defined by this document can be found online at the schema location described at [4.3.4](#).

NOTE 2 See [Annex B](#) for additional resources that support usage of the XML schemas defined in this clause.

5.2 XML schemas belonging to the ISO 19115 series

XML schemas belonging to the ISO 19115 series are provided in [Table 5](#) to [Table 23](#).

These schema use a new version of the Geographic Common Objects namespace defined by ISO/TS 19139-1:2019 that is conventionally identified using the prefix `gco` and defined in ISO 19103. Its namespace URI is `https://schemas.isotc211.org/19103/-/gco/1.2`.

Table 5 — XML schema: Metadata application information classes (ISO 19115-1)

Namespace prefix	mda (abbreviation of “MetaData Application”)
Namespace URI	<code>https://schemas.isotc211.org/19115/-1/mda/1.3</code>
UML package name	Metadata application information
UML package source	ISO 19115-1:2014, 6.2
Scope	Include classes for describing resource collections with hierarchical metadata.
Relevant provision classes and provisions	

Table 5 (continued)

Relevant conformance classes and tests	
--	--

Table 6 — XML schema: Metadata information classes (ISO 19115-1)

Namespace prefix	mdb (abbreviation of “MetaData Base”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mdb/1.3
UML package name	Metadata information
UML package source	ISO 19115-1:2014, 6.5.2
Scope	Define metadata root element and properties, with abstract implementation. This namespace is intended to support profile development.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 7 — XML schema: Identification information classes (ISO 19115-1)

Namespace prefix	mri (abbreviation of “Metadata for Resource Identification”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mri/1.3
UML package name	Identification information
UML package source	ISO 19115-1:2014, 6.5.3
Scope	Descriptive information about the resource.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 8 — XML schema: Constraint information classes (ISO 19115-1)

Namespace prefix	mco (abbreviation of “Metadata for COntstraints”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mco/1.3
UML package name	Constraint information
UML package source	ISO 19115-1:2014, 6.5.4
Scope	Specify constraints on access and use.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 9 — XML schema: Lineage information / Extended Lineage information classes (ISO 19115-1)

Namespace prefix	mrl (abbreviation of “Metadata for Resource Lineage”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mrl/1.3
UML package name	Lineage information / Extended Lineage information
UML package source	ISO 19115-1:2014, 6.5.5; ISO 19115-2:2019, 6.3.3
Scope	Resource provenance
Relevant provision classes and provisions	

Table 9 (continued)

Relevant conformance classes and tests	
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Table 10 — XML schema: Maintenance information classes (ISO 19115-1)

Namespace prefix	mmi (abbreviation of “Metadata for Maintenance Information”)
Namespace URI	https://schemas.isotc211.org/19115/-1/19115-1/1.3
UML package name	Maintenance information
UML package source	ISO 19115-1:2014, 6.5.6
Scope	Maintenance of resources and metadata.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 11 — XML schema: Spatial representation information classes (ISO 19115-1)

Namespace prefix	msr (abbreviation of “Metadata for Spatial Representation”)
Namespace URI	https://schemas.isotc211.org/19115/-1/19115-1/1.3
UML package name	Spatial representation information
UML package source	ISO 19115-1:2014, 6.5.7; ISO 19115-2:2019, 6.3.4
Scope	Encoding of location information in resource content.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 12 — XML schema: Reference system information classes (ISO 19115-1)

Namespace prefix	mrs (abbreviation of “Metadata for Reference System”)
Namespace URI	https://schemas.isotc211.org/19115/-1/19115-1/1.3
UML package name	Reference system information
UML package source	ISO 19115-1:2014, 6.5.8; ISO 19115-1:2014/Amd 2:2020, 6.5.8
Scope	Spatial reference system for resource content.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 13 — XML schema: Content information / Extended Content information classes (ISO 19115-1)

Namespace prefix	mrc (abbreviation of “Metadata for Resource Content”)
Namespace URI	https://schemas.isotc211.org/19115/-1/19115-1/1.3
UML package name	Content information / Extended Content information
UML package source	ISO 19115-1:2014, 6.5.9; ISO 19115-2:2019, 6.3.5
Scope	Resource data structure and content.
Relevant provision classes and provisions	

Table 13 *(continued)*

Relevant conformance classes and tests	
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Table 14 — XML schema: Portrayal catalogue information classes (ISO 19115-1)

Namespace prefix	mpc (abbreviation of “Metadata for Portrayal Catalogue”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mpc/1.3
UML package name	Portrayal catalogue information
UML package source	ISO 19115-1:2014, 6.5.10
Scope	Portrayal of described resource.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 15 — XML schema: Distribution information classes (ISO 19115-1)

Namespace prefix	mrd (abbreviation of “Metadata for Resource Distribution”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mrd/1.3
UML package name	Distribution information
UML package source	ISO 19115-1:2014, 6.5.11
Scope	How a resource is distributed.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 16 — XML schema: Metadata extension information classes (ISO 19115-1)

Namespace prefix	mex (abbreviation of “Metadata for EXtension”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mex/1.3
UML package name	Metadata extension information
UML package source	ISO 19115-1:2014, 6.5.12
Scope	Extensions to metadata content.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 17 — XML schema: Application schema information classes (ISO 19115-1)

Namespace prefix	mas (abbreviation of “Metadata for Application Schema”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mas/1.3
UML package name	Application schema information
UML package source	ISO 19115-1:2014, 6.5.13
Scope	Application schema used to build a dataset.
Relevant provision classes and provisions	

Table 17 (continued)

Relevant conformance classes and tests	
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Table 18 — XML schema: Service metadata information classes (ISO 19115-1)

Namespace prefix	srv (abbreviation of “SeRVice metadata”)
Namespace URI	https://schemas.isotc211.org/19115/-1/srv/1.3
UML package name	Service metadata information
UML package source	ISO 19115-1:2014, 6.5.14
Scope	Information specific to service resources.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 19 — XML schema: Extent information classes (ISO 19115-1)

Namespace prefix	gex (abbreviation of “Geospatial EXtent”)
Namespace URI	https://schemas.isotc211.org/19115/-1/gex/1.3
UML package name	Extent information
UML package source	ISO 19115-1:2014, 6.6.1
Scope	Elements for specifying geospatial properties of a resource, including extent and spatial reference systems.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 20 — XML schema: Citation and responsible party information classes (ISO 19115-1)

Namespace prefix	cit (abbreviation of “CITation”)
Namespace URI	https://schemas.isotc211.org/19115/-1/cit/1.3
UML package name	Citation and responsible party information
UML package source	ISO 19115-1:2014, 6.6.2 and ISO 19115-1:2014, 6.6.3
Scope	Elements for codelist catalogues, and example catalogues.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 21 — XML schema: Common classes (ISO 19115-1)

Namespace prefix	mcc (abbreviation of “Metadata for Common Classes”)
Namespace URI	https://schemas.isotc211.org/19115/-1/mcc/1.3
UML package name	Common classes
UML package source	ISO 19115-1:2014, 6.6.4
Scope	Elements used by all other packages.
Relevant provision classes and provisions	

Table 21 (continued)

Relevant conformance classes and tests	
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Table 22 — XML schema: Language-character set localization information classes (ISO 19115-1)

Namespace prefix	lan (abbreviation of “LANguage localization”)
Namespace URI	https://schemas.isotc211.org/19115/-1/lan/1.3
UML package name	Language-character set localization information
UML package source	ISO 19115-1:2014, 6.7
Scope	Elements for cultural and linguistic adaptability.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

Table 23 — XML schema: Acquisition Information classes (ISO 19115-2)

Namespace prefix	mac (abbreviation of “Metadata Acquisition information”)
Namespace URI	https://schemas.isotc211.org/19115/-2/mac/2.2
UML package name	Acquisition information
UML package source	ISO 19115-2:2019, 6.3.2
Scope	Elements for acquisition of spatial data.
Relevant provision classes and provisions	
Relevant conformance classes and tests	

5.3 XML schemas outside of the ISO 19115 series

In addition to those namespaces listed in [5.2](#), this document makes use of the following XML namespaces that are defined outside of the ISO 19115 series.

XML schemas outside of the ISO 19115 series are provided in [Table 24](#) to [Table 32](#).

Table 24 — XML schema: Data quality classes (ISO 19157)

Namespace prefix	dqc (abbreviation of “Data Quality Common”)
Namespace URI	https://schemas.isotc211.org/19157/-2/dqc/1.1
UML package name	Data quality common
UML package source	ISO 19157:2013

Table 25 — XML schema: Feature catalogue classes (ISO 19110)

Namespace prefix	fcc (abbreviation of “Feature Catalogue Common”)
Namespace URI	https://schemas.isotc211.org/19110/-/fcc/2.1
UML package name	Feature catalogue common
UML package source	ISO 19110:2016

Table 26 — XML schema: General feature classes (ISO 19110)

Namespace prefix	gfc (abbreviation of “General Feature Catalogue”)
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Table 26 (continued)

Namespace URI	https://schemas.isotc211.org/19110/-/gfc/2.1
UML package name	General feature classes
UML package source	ISO 19110:2016

Table 27 — XML schema: Geospatial common type classes (ISO 19103)

Namespace prefix	gco (abbreviation of “Geospatial Common Objects”)
Namespace URI	https://schemas.isotc211.org/19103/-/gco/1.2
UML package name	Geospatial common objects
UML package source	ISO 19103:2015

Table 28 — XML schema: Geospatial Common Extended Type classes (ISO 19103)

Namespace prefix	gcx (abbreviation of “Geospatial Common objects eXtended”)
Namespace URI	https://schemas.isotc211.org/19103/-/gcx/1.2
UML package name	Geospatial common objects extended
UML package source	ISO 19103:2015

Table 29 — XML schema: Geography Markup Language wrapper classes (ISO 19136-1)

Namespace prefix	gmw (abbreviation of “Geography Markup language Wrapper”)
Namespace URI	https://schemas.isotc211.org/19136/-1/gmw/1.1
UML package name	GML wrapper
UML package source	ISO 19136-1:2020
Scope	Namespace that implements properties with values specified by GML classes

Table 30 — XML schema: Geography Markup Language (GML) classes (OGC GML 3.2)^[15]

Namespace prefix	gml (abbreviation of “Geography Markup Language”)
Namespace URI	http://www.opengis.net/gml/3.2
UML package name	Geography markup language
UML package source	Geography Markup Language version 3.2 (OGC 02-009)
Guidance	Authoritative XML schemas located at http://schemas.opengis.net/gml/3.2.1/gml.xsd

Table 31 — XML schema: XML linking (W3C xlink)^[16]

Namespace prefix	xlink (abbreviation of “Xml LINKing language”)
Namespace URI	https://www.w3.org/1999/xlink
UML package name	XML linking language
UML package source	W3C XML Linking Language version 1.0 (W3C xlink11)

Table 31 *(continued)*

Guidance	To locate the authoritative XML schemas associated with this namespace, also refer to ISO 19136-1:2020.
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Table 32 — XML schema: Schema definition classes (W3C XMLSchema)^[19]

Namespace prefix	xs (abbreviation of “Xml Schema”)
Namespace URI	https://www.w3.org/2001/XMLSchema
UML package name	W3C XML schema definition schema
UML package source	W3C

5.4 XML schemas required for a minimum metadata interchange XML document

This document defines requirements for a minimum metadata interchange XML document, described in [Clause 7](#).

Namespace URIs and namespace prefix conventions for a minimum metadata interchange XML document type, which aggregate multiple namespaces and conformance classes, are listed in Conformance class A.4: Validation of minimum valid XML metadata instance (ISO 19115-1).

The minimal set of XML schemas needed to satisfy the requirements are described in this subclause (see [Table 33](#)).

Table 33 — XML schema: Namespaces for minimum metadata instance (ISO 19115-1)

Namespace prefix	mdb, mri, cit, mcc, lan, gco (if dataset, gex; if service, srv)
Namespace URI	
UML package name	Valid minimum metadata instance
UML package source	ISO 19115-1:2014, 6.2
Scope	Implement elements and properties for minimal metadata properties required by ISO 19115-1:2014.
Relevant conformance classes and tests	
Guidance	

6 Requirements of ISO 19115-1:2014 and ISO 19115-2:2019

6.1 General

ISO 19115-1:2014 and ISO 19115-2:2019 provide conceptual models for representing metadata of geographic information resources.

While ISO 19115-1:2014 and ISO 19115-2:2019 describe conformance requirements and allow for “user-defined metadata” and “profiles”, they do not explicitly define normative statement classes, specification targets, or assign identifiers for these elements.

This document formally defines the normative statement classes, normative statements, conformance classes, conformance tests of ISO 19115-1:2014 and ISO 19115-2:2019, and assigns identifiers to them.

6.2 Metadata modules

Prefixes and other information for namespaces specified in UML packages defined in ISO 19115-1:2014 and ISO 19115-2:2019 are described in [Table 34](#) to [Table 58](#).

Table 34 — Requirements class 1: Metadata core (ISO 19115-1)

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core
Target type	Metadata instance
Conformance class	Conformance class A.1: Metadata core (ISO 19115-1)
Source	ISO 19115-1:2014, Clause 6
Description	Metadata core
Provisions	Requirement 1: Metadata basic data requirements Requirement 2: Metadata application information data requirements Requirement 3: Identification information data requirements Requirement 4: Constraint information data requirements Requirement 5: Lineage information data requirements Requirement 6: Maintenance information data requirements Requirement 7: Spatial representation information data requirements Requirement 8: Reference system information data requirements Requirement 9: Content information data requirements Requirement 10: Portrayal catalogue information data requirements Requirement 11: Distribution information data requirements Requirement 12: Metadata extension information data requirements Requirement 13: Application schema information data requirements Requirement 14: Service metadata information data requirements Requirement 15: Extent information data requirements Requirement 16: Citation, responsibility and party information data requirements Requirement 17: Commonly used classes data requirements Requirement 18: Multilingual support data requirements

Table 35 — Requirement 1: Metadata basic data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/basic
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.2
UML package	MD_Metadata
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.2.

Table 36 — Requirement 2: Metadata application information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/application
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)

Table 36 (continued)

UML source	ISO 19115-1:2014, 6.2
UML package	See ISO 19115-1:2014, 6.2
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.2.

Table 37 — Requirement 3: Identification information data requirements

Identifier	https://standards.iso211.org/19115/-1/1/req/metadata-core/identification
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.3
UML package	MD_Identification
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.3.

Table 38 — Requirement 4: Constraint information data requirements

Identifier	https://standards.iso211.org/19115/-1/1/req/metadata-core/constraints
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.4
UML package	MD_Constraints
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.4.

Table 39 — Requirement 5: Lineage information data requirements

Identifier	https://standards.iso211.org/19115/-1/1/req/metadata-core/lineage
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.5; ISO 19115-2:2019, 6.3.3
UML package	LI_Lineage
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.5.

Table 40 — Requirement 6: Maintenance information data requirements

Identifier	https://standards.iso211.org/19115/-1/1/req/metadata-core/maintenance
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.6
UML package	MD_MaintenanceInformation

Table 40 (continued)

Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.6.
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Table 41 — Requirement 7: Spatial representation information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/spatial-representation
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.7; ISO 19115-2:2019, 6.3.4
UML package	MD_SpatialRepresentation
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.7.

Table 42 — Requirement 8: Reference system information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/reference-system
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.8; ISO 19115-1:2014/Amd 2:2020, 6.5.8
UML package	MD_ReferenceSystem
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.8.

Table 43 — Requirement 9: Content information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/content
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.9; ISO 19115-2:2019, 6.3.5
UML package	MD_ContentInformation
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.9.

Table 44 — Requirement 10: Portrayal catalogue information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/portrayal-catalogue
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.10
UML package	MD_PortrayalCatalogueReference
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.10.

Table 45 — Requirement 11: Distribution information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/distribution
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)

Table 45 (continued)

UML source	ISO 19115-1:2014, 6.5.11
UML package	MD_Distribution
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.11.

Table 46 — Requirement 12: Metadata extension information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/metadata-extension
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.12
UML package	MD_MetadataExtensionInformation
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.12.

Table 47 — Requirement 13: Application schema information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/application-schema
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.13
UML package	MD_ApplicationSchemaInformation
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.13.

Table 48 — Requirement 14: Service metadata information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/service-metadata
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.5.14
UML package	Service metadata information (including SV_ServiceIdentification, SV_OperationMetadata, MD_DataIdentification)
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.5.14.

Table 49 — Requirement 15: Extent information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/extent
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.6.1
UML package	EX_Extent
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.6.1.

Table 50 — Requirement 16: Citation, responsibility and party information data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/citation
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Table 50 (continued)

Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.6.2 and ISO 19115-1:2014, 6.6.3
UML package	CI_Citation, CI_Responsibility, CI_Party
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.6.2, 6.6.3.

Table 51 — Requirement 17: Commonly used classes data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/common
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.6.4
UML package	Common classes
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.6.4.

Table 52 — Requirement 18: Multilingual support data requirements

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-core/multilingual
Subject	Metadata instance
Included in	Requirements class 1: Metadata core (ISO 19115-1)
UML source	ISO 19115-1:2014, 6.7
UML package	PT_Locale
Statement	A metadata instance shall adhere to rules defined in ISO 19115-1:2014, 6.7 and ISO/TS 19139-1:2019, 7.3.

Table 53 — Requirements class 2: Metadata extensions and profiles (ISO 19115-1)

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-extend
Target type	Metadata scheme
Conformance class	Conformance class A.2: Metadata extensions and profiles (ISO 19115-1)
Prerequisite	Requirements class 1: Metadata core (ISO 19115-1)
Source	ISO 19115-1:2014, Annex C
Description	Metadata extensions and profiles
Provisions	Requirement 19: Metadata extension Requirement 20: Metadata profile

Table 54 — Requirement 19: Metadata extension

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-extend/extension
Subject	Metadata scheme
Included in	Requirements class 2: Metadata extensions and profiles (ISO 19115-1)

Table 54 (continued)

Statement	A metadata extension scheme shall adhere to rules defined in ISO 19115-1:2014, C.3,C.4.
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Table 55 — Requirement 20: Metadata profile

Identifier	https://standards.isotc211.org/19115/-1/1/req/metadata-extend/profile
Subject	Metadata scheme
Included in	Requirements class 2: Metadata extensions and profiles (ISO 19115-1)
Statement	A metadata profile shall adhere to rules defined in ISO 19115-1:2014, C.5, C.6.
Guidance	Re-used by reference in ISO 19115-2:2019.

Table 56 — Requirements class 3: Extensions for acquisition and processing (ISO 19115-2)

Identifier	https://standards.isotc211.org/19115/-2/2/req/metadata-extensions
Target type	Metadata instance
Conformance class	Conformance class A.3: Extensions for acquisition and processing (ISO 19115-2)
Prerequisite	Requirements class 1: Metadata core (ISO 19115-1)
Source	ISO 19115-2:2019, 6.3
Description	Extensions for acquisition and processing
Provisions	Requirement 21: Acquisition information data requirements Requirement 22: Extended lineage information data requirements

Table 57 — Requirement 21: Acquisition information data requirements

Identifier	https://standards.isotc211.org/19115/-2/2/req/metadata-extensions/acquisition
Subject	Metadata instance
Included in	Requirements class 3: Extensions for acquisition and processing (ISO 19115-2)
UML source	ISO 19115-2:2019, 6.3.2
UML package	See ISO 19115-2:2019, 6.3.2
Statement	A metadata instance shall adhere to rules defined in ISO 19115-2:2019, 6.3.2.

Table 58 — Requirement 22: Extended lineage information data requirements

Identifier	https://standards.isotc211.org/19115/-2/2/req/metadata-extensions/extended-lineage
Subject	Metadata instance
Included in	Requirements class 3: Extensions for acquisition and processing (ISO 19115-2)
Prerequisite	Requirement 5: Lineage information data requirements
UML source	ISO 19115-2:2019, 6.3.3
UML package	See ISO 19115-2:2019, 6.3.3
Statement	A metadata instance shall adhere to rules defined in ISO 19115-2:2019, 6.3.3.

The conformance classes and tests of ISO 19115-1 and ISO 19115-2 defined in this document are available in [Clause A.2](#).

7 Requirements for metadata interchange documents

In order to foster metadata interoperability, this document defines a requirements class for a minimum metadata instance that allows progressively increasing capability for describing resources and their relationships through extension.

Requirements for the minimum metadata instance shall be in accordance with ISO 19115-1:2014, ISO 19115-1:2014/Amd 1:2018 and ISO 19115-1:2014/Amd 2:2020 collectively.

A valid minimal metadata instance is defined as an XML instance satisfying the following core conditions, as follows.

- a) It is a well-formed XML instance, with `MD_Metadata` as its root element (see Requirement 25: Root element of the metadata minimal instance is an `MD_Metadata` element, [Table 62](#)).
- b) It includes contact information related to the metadata (`MD_Metadata.contact` takes a `CI_Responsibility` object, see ISO 19115-1:2014, 6.5.2) (see Requirement 26: Provides contact information related to the metadata, [Table 63](#)).
- c) It includes metadata date where `dateType = "creation"` (`MD_Metadata.dateInfo` takes a `CI_Date` object, see ISO 19115-1:2014, 6.5.2) (see Requirement 27: Provides creation date of the metadata, [Table 64](#)).
- d) If the metadata is not about a dataset, the `MD_Metadata.metadataScope` attribute has to be provided in the form of an `MD_MetadataScope` instance. If not provided, the `MD_Metadata.metadataScope` object points to a default type of "dataset" (see Requirement 28: Provides metadata scope of the metadata, [Table 65](#)).
- e) It includes an identification object under `MD_Metadata.identificationInfo` (which takes an instance for identification, see ISO 19115-1:2014, 6.5.3), of which the value class depends on the value of `MD_Metadata.metadataScope` (see Requirements class 8: XML implementation of identification information (ISO 19115-1), [Table 81](#)).
 - 1) If the `MD_Metadata.metadataScope` instance has attribute `resourceScope` pointing to an `MD_ScopeCode` value of service, the identification object is an instance of `SV_ServiceIdentification`.
 - i) In an `SV_ServiceIdentification` instance, the attribute `serviceType` is mandatory. (see Requirement 91: Provides service type, [Table 143](#))
 - 2) Otherwise, the identification object is an instance of `MD_DataIdentification`.
- f) If `MD_Metadata.metadataScope` has a value of "dataset", the object referenced by the `MD_Metadata.identificationInfo` shall provide a geographic extent (see Requirement 44: Provides geographic extent of dataset, [Table 85](#)), as one of the following:
 - 1) `extent.geographicElement.EX_GeographicBoundingBox`, describing a bounding box with N/S/E/W, latitude and longitude; or
 - 2) `extent.geographicElement.EX_GeographicDescription`, describing an extent with an identifier code.
- g) If `MD_Metadata.metadataScope` has a value of "service" or "dataset", the attribute `MD_Metadata.topicCategory` is mandatory (see Requirement 45: Topic category of resource identification instance, [Table 86](#)).

To validate the above conditions, it is sufficient to have the XML instance validated against the required XML schemas and their corresponding Schematrons.

The above conditions are formally expressed as requirements in [Table 59](#) to [Table 68](#).