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**ISO/IEC TR
19583-24**

Information technology — Concepts and usage of metadata —

Part 24: **11179-3:2013 Metamodel in RDF**

*Technologies de l'information — Concepts et utilisation des
métadonnées —*

Partie 24: Métamodèle dans RDF ISO/IEC 11179-3:2013

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 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 or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

A list of all parts in the ISO/IEC 19583 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

Introduction

The ISO/IEC 11179 series on Metadata registries (MDR) addresses the semantics of data, the representation of data, and the registration of the descriptions of that data. The semantic and representational components are described through attributes contained in the conceptual model of a metadata registry as specified in ISO/IEC 11179-3. ISO/IEC 11179-3 provides the basic conceptual model, including the basic attributes and relationships, for a metadata registry.

ISO/IEC 11179-3 defines a common conceptual model, but not a physical implementation. Therefore, the metamodel need not be physically implemented exactly as specified. However, it must be possible to unambiguously map between the implementation and the metamodel in both directions. If implementers can ensure such a mapping, it only partially addresses the issue of interoperability, even between registry products that can claim the same conformance level.

ISO/IEC 11179-3:2013 Metamodel in RDF addresses interoperability from multiple perspectives. It defines a semantic and formal representation of the ISO/IEC 11179-3:2013 conceptual model based on the W3C Resource Description Framework (RDF). This model constitutes a machine readable representation, and can therefore be easily exchanged and explored using RDF based software tools. It can be used by implementers as a common target model for mapping between a specific implementation and the metamodel. Hence, implementers can use this to map against a common target model and more easily identify interoperability issues. A formal RDF model can also be instantiated and therefore serve as a direct exchange format between registry products.

ISO/IEC 11179-3:2013 has been withdrawn and replaced by ISO/IEC 11179-3:2023. The terms used in this document are those defined in ISO/IEC 11179-3:2013 and ISO/IEC 11179-6:2015.

[Annex A](#) provides a summary of the differences between ISO/IEC 11179-3:2013 and its successors ISO/IEC 11179-3:2023, ISO/IEC 11179-31:2023 and ISO/IEC 11179-32:2023.

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Information technology — Concepts and usage of metadata —

Part 24:

11179-3:2013 Metamodel in RDF

1 Scope

This document specifies the structure of ISO/IEC 11179-3:2013. It defines a mapping of the ISO/IEC 11179-3:2013 conceptual model to a formal schema representation based on the W3C Resource Description Framework (RDF). The schema is available as a separate artefact. This document specifies the principles and conventions that were followed to map classes, attributes, and associations of the conceptual model to a formal RDF schema.

This document does not provide detailed explanatory details about the ISO/IEC 11179 series or RDF. For more information, refer to References [7] to [9].

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/IEC 11179-3:2013¹⁾, *Information technology — Metadata registries (MDR) — Part 3: Metamodel for registry common facilities*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11179-3:2013 and the following apply.

ISO and IEC maintain terminological 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 Terms and definitions of metamodel constructs

3.1.1

class

(metamodel) description of a set of *objects* (3.2.1) that share the same *attributes* (3.1.7), operations, methods, *relationships* (3.1.2), and semantics

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.5]

1) Withdrawn and replaced by ISO/IEC 11179-3:2023, ISO/IEC 11179-30:2023, ISO/IEC 11179-31:2023 and ISO/IEC 11179-32:2023.

3.1.2

relationship

<metamodel> connection among model elements

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.15]

3.1.3

association

<metamodel> semantic *relationship* (3.1.2) between two *classes* (3.1.1)

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.2]

3.1.4

association class

<metamodel> *association* (3.1.3) that is also a *class* (3.1.1)

Note 1 to entry: An association class not only connects a set of classes, but also defines a set of features that belong to the association itself.

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.3]

3.1.5

superclass

class (3.1.1) that is a generalization of one or more other classes, its *subclasses* (3.1.6)

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.18]

3.1.6

subclass

class (3.1.1) that is a specialization of another class, its *superclass* (3.1.5)

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.17]

3.1.7

attribute

<metamodel> *characteristic* (3.2.4) of an *object* (3.2.1) or set of objects

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.4]

3.1.8

datatype

set of distinct values, characterized by properties of those values and by operations on those values

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.9]

3.1.9

identifier

<metamodel> sequence of characters, capable of uniquely identifying that with which it is associated, within a specified context

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.11]

3.1.10

package

grouping of metadata objects that provides a *namespace* (3.2.13) for the grouped objects, and allows them to be referenced as a group

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.13]

3.1.11

metamodel region

sub-division of a *package* ([3.1.10](#)) used to organize metadata objects for ease of explanation

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.1.12]

3.2 Terms and definitions of concepts

3.2.1

object

anything perceivable or conceivable

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.87]

3.2.2

object class

set of ideas, abstractions or things in the real world that are identified with explicit boundaries and meaning and whose properties and behaviour follow the same rules

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.88]

3.2.3

property

quality common to all members of an *object class* ([3.2.2](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.100]

3.2.4

characteristic

abstraction of a *property* ([3.2.3](#)) of an *object* ([3.2.1](#)) or of a set of objects

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.14]

3.2.5

classification scheme

descriptive information for an arrangement or division of *objects* ([3.2.1](#)) into groups based on criteria such as *characteristics* ([3.2.4](#)), which the objects have in common

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.16]

3.2.6

concept

unit of knowledge created by a unique combination of *characteristics* ([3.2.4](#))

Note 1 to entry: A concept is independent of its representation.

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.18]

3.2.7

relation

sense in which *concepts* ([3.2.6](#)) may be connected, via constituent roles

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.119]

3.2.8

concept system

set of *concepts* ([3.2.6](#)) structured according to the *relations* ([3.2.7](#)) among them

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.19]

3.2.9

namespace

scoping mechanism used for grouping related identifiers and for avoiding naming collisions between multiple identifiers that share the same name

3.2.10

namespace prefix

scoping identifier that is bound to a namespace

3.2.11

language

system of signs for communication, usually consisting of a vocabulary and rules

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.68]

3.2.12

language tag

tag used to indicate the language of a text or term

3.2.13

vocabulary

body of words used in a particular *language* ([3.2.11](#))

3.2.14

definition

representation of a *concept* ([3.2.6](#)) by a descriptive statement which serves to differentiate it from related concepts

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.39]

3.2.15

data

re-interpretable representation of information in a formalized manner suitable for communication, interpretation or processing

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.27]

3.2.16

metadata

data ([3.2.15](#)) that defines and describes other data

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.74]

3.2.17

metadata object

object type defined by a *metamodel* ([3.2.19](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.74]

3.2.18

data model

graphical and/or lexical representation of *data* ([3.2.15](#)), specifying their properties, structure and inter-relationships

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.36]

3.2.19

metamodel

model that specifies one or more other models

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.80]

3.2.20

metamodel construct

unit of *notation* ([3.2.21](#)) for modeling

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.81]

3.2.21

notation

formal syntax and associated semantics

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.86]

3.2.22

registry

information system for *registration* ([3.2.23](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.113]

3.2.23

registration

inclusion of an item in a *registry* ([3.2.22](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.108]

3.2.24

registry product

particular implementation system for implementing a *registry* ([3.2.22](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.117]

3.2.25

registry metamodel

metamodel ([3.2.19](#)) specifying the model for a *registry* ([3.2.22](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.116]

3.2.26

metadata registry

MDR

information system for registering *metadata* ([3.2.19](#))

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.78]

3.2.27

role

specified responsibilities

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.121]

3.2.28

typed literal

literal with a defined range of possible values

3.2.29

boolean

mathematical *datatype* ([3.1.8](#)) associated with two-valued logic

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.12]

3.2.30

date

datatype (3.1.8) whose values are points in time to the resolution: year, month, day

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.37]

3.2.31

datetime

datatype (3.1.8) whose values are points in time to the resolution: year, month, day, hour, minute, second, and optionally fractions thereof

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.38]

3.2.32

integer

mathematical *datatype* (3.1.8) comprising the exact integral values

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.12]

3.2.33

string

family of *datatypes* (3.1.8) which represent strings of symbols from standard character-sets

[SOURCE: ISO/IEC ISO 11179-3:2013, 3.2.129]

3.2.34

syntax

relationships among characters or groups of characters, independent of their meanings or the manner of their interpretation and use

[SOURCE: ISO/IEC 11179-5:2015, 4.32]

3.2.35

camel case

convention to combine words in a single identifier without spaces or punctuation such that each word except the first starts with a capital letter

Note 1 to entry: See 3.2.36 for Pascal case and 3.2.37 for snake case.

3.2.36

Pascal case

convention to combine words in a single identifier without spaces or punctuation such that each word starts with a capital letter

Note 1 to entry: See 3.2.35 for camel case and 3.2.37 for snake case.

3.2.37

snake case

convention to combine words in a single identifier such that words are separated by one underscore character

Note 1 to entry: See 3.2.35 for camel case and 3.2.36 for Pascal case.

3.2.38

schema

framework for organizing and interpreting information

3.2.39

XML Schema

W3C (3.2.40) recommendation used to describe and validate the structure and content of XML documents

Note 1 to entry: See References [12] and [13].

3.2.40

World Wide Web Consortium W3C

international community where Member organizations, a full-time staff, and the public work together to develop Web standards

3.2.41

serialization format

data storage format for storing, transmitting, and reconstructing data structures or object state

3.2.42

Unicode

standard for digital representation of the characters used in writing all of the world's languages

Note 1 to entry: See Reference [11].

3.3 Terms and definitions of knowledge organization systems

3.3.1

knowledge organization system

system used to manage and organize knowledge

3.3.2

model-theoretic semantics

formal account of the interpretations of legitimate expressions of a language

3.3.3

ontology

set of *concepts* (3.2.6) and categories in a subject area or domain that shows their properties and the *relations* (3.2.7) between them

3.3.4

first-order (predicate) logic

FOL

formal system that allows existential (there exists) and universal (for all) statements quantifying over terms and variables related by predicates

3.3.5

decidable, adj

<logic system> has an effective procedure (algorithm) to determine if a given well-formed formula is a theorem

3.3.6

Resource Description Framework

RDF

W3C (3.2.40) standard defining a formal syntax and semantics for expressing descriptions of *resources* (3.3.8) that can be represented as a directed data graph

Note 1 to entry: See Reference [7].

3.3.7

triple

syntax (3.2.34) to express descriptions of *resources* (3.3.8) consisting of a subject, a *predicate* (3.3.10), and an object

3.3.8

resource

element from a universe of discourse denoted by an *IRI* (3.3.9)

3.3.9**Internationalized Resource Identifier****IRI**

sequence of characters from the *Unicode* ([3.2.42](#)) character set

3.3.10**predicate**

<RDF> *IRI* ([3.3.9](#)) denoting a property, which itself is a *resource* ([3.3.8](#)) representing a binary relation

3.3.11**reification**

mechanism used to represent the token of a *triple* ([3.3.7](#)) as a *resource* ([3.3.8](#)) so that it is possible to make statements about statements

3.3.12**Terse RDF Triple Language****Turtle**

concrete *syntax* ([3.2.34](#)) for *RDF* ([3.3.6](#))

Note 1 to entry: See Reference [9].

3.3.13**RDF Schema****RDFS**

data modeling vocabulary for *RDF* ([3.3.6](#)) data

Note 1 to entry: See Reference [8].

3.3.14**Web Ontology Language****OWL**

W3C ([3.2.40](#)) recommendation defining syntax and model-theoretic semantics of a family of computational logic-based languages used for knowledge representation

Note 1 to entry: See Reference [6].

3.3.15**OWL class**

representation of a concept (class intension) associated with a set of individuals (class extension)

3.3.16**OWL object property**

relationship between pairs of individuals

3.3.17**functional property**

OWL object property ([3.3.16](#)) indicating a functional relationship between two *predicates* ([3.3.10](#))

3.3.18**inverse property**

OWL object property ([3.3.16](#)) indicating an inverse relationship between two *predicates* ([3.3.10](#))

3.3.19**profile**

sub-language defined by a syntactic restriction of the Web Ontology Language that offers advantages in particular application scenarios, in particular trade-offs between expressive power and computational benefits

3.3.20

**Simple Knowledge Organization System
SKOS**

RDF (3.3.6) vocabulary for representing semi-formal *knowledge organization systems* (3.3.1) such as thesauri, RDFS domain, *classification schemes* (3.2.5) and subject headings lists

Note 1 to entry: See Reference [10].

4 Modeling principles and mapping conventions

4.1 Guiding principles of the ISO/IEC 11179-3:2013 Metamodel in RDF

The goal of ISO/IEC 11179-3:2013 Metamodel in RDF is to provide a complete and faithful mapping of all classes, attributes, and associations of the ISO/IEC 11179-3:2013 conceptual model to a formal schema based on the Resource Description Framework (RDF). The principles and conventions for this mapping are predicated on a lightweight approach as explained in the following sections.

4.2 Use of RDF and RDF based vocabularies

The Resource Description Framework (RDF) defines a formal language to create first-order predicate statements in a subject/predicate/object format, called a triple. Subjects and predicates are resources. Objects can be either resources or typed literals. A resource is represented by an Internationalized Resource Identifier (IRI). A typed literal consists of three elements: a Unicode string, a datatype IRI, and optionally a language tag. The datatype abstraction is compatible with XML Schema. Any datatype definition that conforms to this abstraction may be used in RDF. Most of the common XML Schema built-in datatypes can be used with RDF out of the box. The RDF specification defines an abstract syntax, a formal model-theoretic semantics, a query language, and several serialization formats for storing and exchanging RDF. ISO/IEC 11179-3:2013 Metamodel in RDF is written in the Turtle serialization format.

The W3C RDF Schema specification defines a core data modeling vocabulary for RDF. It is itself a semantic extension written in RDF. Using RDF Schema, it is possible to define classes, subclasses, datatypes, properties, subproperties, and domains and ranges of properties. These are the core RDF Schema elements that have been used in writing ISO/IEC 11179-3:2013 Metamodel in RDF. Other RDF Schema vocabulary elements (containers, collections, reification) have not been used.

The W3C Web Ontology Language (OWL) specification defines an extensive modeling ontology that integrates with RDF and RDF Schema. It comes in several versions and profiles, targeting different levels of expressiveness related to reasoning, e.g. OWL 2 DL (description logic) is a decidable fragment of first-order predicate logic (FOL). Extensive use of OWL increases expressiveness, but does so at the cost of considerable complexity. ISO/IEC 11179-3:2013 Metamodel in RDF uses a lightweight approach by using a limited set of OWL constructs (OWL classes, object properties, datatype properties, functional properties, inverse properties). Users may choose to extend the schema with additional OWL constructs for implementation purposes.

The W3C Simple Knowledge Organization System (SKOS) is an RDF based vocabulary for representing knowledge organization systems such as thesauri, taxonomies, and classification schemes. ISO/IEC 11179-3:2013 Metamodel in RDF uses the SKOS vocabulary with a dual purpose. First, each class, property, and association is annotated with a SKOS definition, a SKOS preferred label, SKOS notes, and SKOS examples taken from ISO/IEC 11179-3:2013, so that ISO/IEC 11179-3:2013 Metamodel in RDF is a fully self-describing schema. Second, ISO/IEC 11179-3:2013 itself describes the notion of concepts and concept schemes, which can be mapped directly to SKOS.

[Table 1](#) shows the schema constructs from RDF, RDF Schema, OWL, and SKOS that have been used in writing ISO/IEC 11179-3:2013 Metamodel in RDF.

Table 1 — Schema constructs

Vocabulary	Schema element	Description
RDF Schema	rdf:type	Defines the class of a resource or the datatype of a literal
	rdfs:subClassOf	Defines a subclass relationship between types
	rdfs:domain	Defines the domain type of a property
	rdfs:range	Defines the range type of a property
OWL	owl:Class	Defines a resource to be an OWL Class
	owl:ObjectProperty	Defines a property to be an object property
	owl:DatatypeProperty	Defines a property to be a datatype property
	owl:FunctionalProperty	Defines a property to be functional
	owl:inverseOf	Defines a property to be the inverse of another property
SKOS	skos:definition	Specifies the definition of a schema element
	skos:prefLabel	Specifies the preferred label of a schema element
	skos:note	Specifies a note about a schema element
	skos:example	Specifies an example of a schema element

4.3 Schema conventions

The following conventions have been used for mapping the ISO/IEC 11179-3:2013 model elements to RDF.

Every model element of ISO/IEC 11179-3:2013 is represented in RDF using an IRI with the namespace <https://standards.iso.org/iso-iec/tr/19583/-24/ed-1/en/> and is abbreviated with the namespace prefix iso-11179.

Every class of ISO/IEC 11179-3:2013 is represented by an OWL class, mapping snake case identifiers to Pascal case identifiers, for example the Data_Element class in ISO/IEC 11179-3:2013 is mapped to the resource identifier iso-11179:DataElement. The same applies to association classes defined by ISO/IEC 11179-3:2013.

Basic types defined in ISO/IEC 11179-3:2013, 6.2 are either mapped to existing rdfs:Datatype instances (for example xsd:string) or are mapped to new rdfs:Datatype instances (for example iso-11179:Text).

Every attribute and relationship defined by ISO/IEC 11179-3:2013 maps to an RDF predicate, and is therefore represented by an IRI.

Attributes with a basic type are represented by RDF datatype properties with a domain referencing an owl:Class and a range referencing an rdfs:Datatype. The domain class corresponds to the attribute's ISO/IEC 11179-3:2013 class. The range datatype corresponds to the attribute's ISO/IEC 11179-3:2013 datatype.

Attributes of other types are represented by RDF object properties with a domain and a range referencing an owl:Class. The domain class corresponds to the attribute's ISO/IEC 11179-3:2013 class. The range class corresponds to the attribute's ISO/IEC 11179-3:2013 datatype.

Associations defined by ISO/IEC 11179-3:2013 are represented by two RDF object properties, one for each role using the verb form of the role. Both RDF object properties reference each other with an owl:inverseOf relationship. The domain and range classes of each OWL object property correspond to the source and target classes of the respective association roles.

Attributes and associations in ISO/IEC 11179-3:2013 are always defined within a context. In the case of an attribute, the context is defined by the class containing the attribute. In the case of an association, the context is defined by the classes on both ends of the association. In RDF, the basic construct is a triple in the form of subject/predicate/object statement. Predicates and classes are orthogonal and can be defined independently of each other. It is possible in RDF to define a predicate (object property or datatype property) without specifying a domain or range. To preserve the context defined by ISO/IEC 11179-3:2013, every attribute and association is mapped to a unique predicate with corresponding domain and range types. As a consequence, same named attributes and association roles from different classes in ISO/IEC 11179-3:2013 are mapped to different predicates in RDF and therefore require distinct IRIs. For example, the classes

Datatype, Individual, Organization, Registry Specification, and Slot defined by ISO/IEC 11179-3:2013 each have a name attribute. Rather than using a single iso-11179:name predicate, the RDF representation uses a distinct predicate for each attribute occurrence. To ensure a unique IRI, the convention has been followed to indicate the attribute class or association role source in the IRI and to use the commonly adopted camel case for RDF predicates. For consistency, this convention has been followed to determine the IRI of each RDF predicate.

- For example, iso-11179:slot.name is the IRI of the predicate representing the name attribute of the Slot class. The domain of iso-11179:slot.name is the OWL class iso-11179:Slot. The range of iso-11179:slot.name is the RDF datatype xsd:string.
- For example, iso-11179:registrar.authorizedBy is the IRI of the predicate representing the role authorizedBy of the registration_authority_registrar association. The domain of this predicate is iso-11179:Registrar. The range is iso-11179:RegistrationAuthority.

ISO/IEC 11179-3:2013 Metamodel in RDF is self-describing. Since classes and predicates in RDF are themselves resources, it is possible to make RDF statements about these resources within the schema itself. Each OWL class and RDF predicate is annotated with a skos:definition and a skos:prefLabel, and optionally with one or more skos:note and skos:example statements. All annotations are verbatim from ISO/IEC 11179-3:2013 and include a section reference of the citation.

4.4 UML Stereotypes

ISO/IEC 11179-3:2013, 5.5 defines a «type» UML stereotype for identified, registered, administered, attached, designatable, and classifiable items. These types can be applied to any item of the registry, subject to the rules in ISO/IEC 11179-3:2013, 5.5, Table 1. The corresponding typing capability in ISO/IEC 11179-3:2013 Metamodel in RDF is achieved by applying the RDFS inference rules for domain, range, and subClassOf predicates.

For example, consider the statement "X iso-11179:designatableItem.hasDesignation Y", expressing the item_designation association for resources X and Y, and with iso-11179:designatableItem.hasDesignation having rdfs:domain iso-11179:DesignatableItem. RDFS inferencing then produces the statement "X rdf:type iso-11179:DesignatableItem", expressing that resource X is a designatable item, and thereby satisfying Rule 2 in ISO/IEC 11179-3:2013, 5.5, Table 1.

5 Overview of ISO/IEC 11179-3:2013 Metamodel in RDF

5.1 Organization

This clause provide additional notes about the RDF mapping, summarized by different regions of the ISO/IEC 11179-3:2013 metamodel.

5.2 Basic types metamodel region (ISO/IEC 11179-3:2013, 6.2)

ISO/IEC 11179-3:2013 basic types are mapped to RDF datatypes. Where possible existing RDF datatypes are used. Otherwise, new RDF datatypes are defined.

[Table 2](#) shows the mappings of the ISO/IEC 11179-3:2013 basic types.

Table 2 — Basic types

Clause	Basic Type	RDF datatype
6.2.2	Boolean	xsd:boolean
6.2.3	Date	xsd:date
6.2.4	Datetime	xsd:dateTime
6.2.5	Integer	xsd:integer
6.2.6	Natural_Range	iso-11179:NaturalRange

Table 2 (continued)

Clause	Basic Type	RDF datatype
6.2.7	Notation	iso-11179:Notation
6.2.8	Phone_Number	iso-11179:PhoneNumber
6.2.9	Postal_Address	iso-11179:PostalAddress
6.2.10	Sign	iso-11179:Sign
6.2.11	String	xsd:string
6.2.12	Text	iso-11179:Text
6.2.13	Value	iso-11179:Value

The rdf:type of an RDF datatype is rdfs:Datatype. RDF datatypes are subclasses of rdfs:Literal.

5.3 Basic Classes metamodel region (ISO/IEC 11179-3:2013, 6.3)

Following are the mappings of the ISO/IEC 11179-3:2013 Basic Classes and their attributes to RDF. Predicates representing attributes are grouped by their domain.

iso-11179:Contact

Predicate	Range
iso-11179:contact.individual	iso-11179:Individual
iso-11179:contact.organization	iso-11179:Organization
iso-11179:contact.role	iso-11179:Role

iso-11179:DocumentType

Predicate	Range
iso-11179:documentType.description	iso-11179:Text
iso-11179:documentType.identifier	xsd:string
iso-11179:documentType.schemeReference	iso-11179:Sign

iso-11179:Individual

Predicate	Range
iso-11179:individual.emailAddress	xsd:string
iso-11179:individual.mailAddress	iso-11179:PostalAddress
iso-11179:individual.name	iso-11179:Sign
iso-11179:individual.phoneNumber	iso-11179:PhoneNumber
iso-11179:individual.role	iso-11179:Role
iso-11179:individual.title	iso-11179:Sign

iso-11179:LanguageIdentification

Predicate	Range
iso-11179:languageIdentification.extensionIdentifier	xsd:string
iso-11179:languageIdentification.geopoliticalTerritoryIdentifier	xsd:string
iso-11179:languageIdentification.languageIdentifier	xsd:string
iso-11179:languageIdentification.privateUseQualifier	xsd:string
iso-11179:languageIdentification.scriptIdentifier	xsd:string
iso-11179:languageIdentification.variantIdentifier	xsd:string

iso-11179:Organization

<i>Predicate</i>	<i>Range</i>
iso-11179:organization.emailAddress	xsd:string
iso-11179:organization.mailAddress	iso-11179:PostalAddress
iso-11179:organization.name	iso-11179:Sign
iso-11179:organization.phoneNumber	iso-11179:PhoneNumber
iso-11179:organization.uri	xsd:string

iso-11179:ReferenceDocument

<i>Predicate</i>	<i>Range</i>
iso-11179:referenceDocument.identifier	xsd:string
iso-11179:referenceDocument.languageIdentifier	iso-11179:LanguageIdentification
iso-11179:referenceDocument.notation	iso-11179:Notation
iso-11179:referenceDocument.provider	iso-11179:Organization
iso-11179:referenceDocument.title	iso-11179:Text
iso-11179:referenceDocument.typeDescription	iso-11179:DocumentType
iso-11179:referenceDocument.uri	xsd:string

iso-11179:RegistrationAuthorityIdentifier

<i>Predicate</i>	<i>Range</i>
iso-11179:registrationAuthorityIdentifier.internationalCodeDesignator	xsd:string
iso-11179:registrationAuthorityIdentifier.opiSource	xsd:string
iso-11179:registrationAuthorityIdentifier.organizationIdentifier	xsd:string
iso-11179:registrationAuthorityIdentifier.organizationPartIdentifier	xsd:string

iso-11179:Role

<i>Predicate</i>	<i>Range</i>
iso-11179:role.emailAddress	xsd:string
iso-11179:role.mailAddress	iso-11179:PostalAddress
iso-11179:role.phoneNumber	iso-11179:PhoneNumber
iso-11179:role.title	iso-11179:Sign

5.4 Identification metamodel region (ISO/IEC 11179-3:2013, 7.2)

Following are the mappings of the ISO/IEC 11179-3:2013 Identification classes, attributes, and associations to RDF. Predicates representing attributes (A) and association roles (R) are grouped by their domain.

iso-11179:IdentifiedItem

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:identifiedItem.extendedBy	iso-11179:Slot
R	iso-11179:identifiedItem.identifiedBy	iso-11179:ScopedIdentifier

iso-11179:ScopedIdentifier

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:scopedIdentifier.fullExpansion	xsd:string
A	iso-11179:scopedIdentifier.identifier	xsd:string
A	iso-11179:scopedIdentifier.shorthandExpression	xsd:string
A	iso-11179:scopedIdentifier.version	xsd:string
R	iso-11179:scopedIdentifier.containedIn	iso-11179:Namespace
R	iso-11179:scopedIdentifier.identifies	iso-11179:IdentifiedItem

iso-11179:Namespace

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:namespace.mandatoryNamingConventionIndicator	xsd:boolean
A	iso-11179:namespace.namingAuthority	iso-11179:Organization
A	iso-11179:namespace.oneItemPerNameIndicator	xsd:boolean
A	iso-11179:namespace.oneNamePerItemIndicator	xsd:boolean
A	iso-11179:namespace.schemeReference	iso-11179:Sign
A	iso-11179:namespace.shorthandPrefix	xsd:string
R	iso-11179:namespace.acceptedConvention	iso-11179:NamingConvention
R	iso-11179:namespace.bindsTo	iso-11179:Designation
R	iso-11179:namespace.maintainedBy	iso-11179:RegistrationAuthority
R	iso-11179:namespace.providesScopeFor	iso-11179:ScopedIdentifier

iso-11179:Slot

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:slot.name	xsd:string
A	iso-11179:slot.type	xsd:string
A	iso-11179:slot.value	xsd:string
R	iso-11179:slot.extends	iso-11179:IdentifiedItem

5.5 Designation and Definition metamodel region (ISO/IEC 11179-3:2013, 7.3)

Following are the mappings of the ISO/IEC 11179-3:2013 Designation and Definition classes, attributes, and associations to RDF. Predicates representing attributes (A) and association roles (R) are grouped by their domain.

iso-11179:Acceptability

The enumeration Acceptability is represented by the OWL class iso-11179:Acceptability. Enumeration values are represented by instances of iso-11179:Acceptability with the following IRIs:

- iso-11179:Acceptability.admitted
- iso-11179:Acceptability.deprecated
- iso-11179:Acceptability.obsolete
- iso-11179:Acceptability.preferred
- iso-11179:Acceptability.superseded

iso-11179:DesignatableItem

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:designatableItem.hasDefinition	iso-11179:Definition
R	iso-11179:designatableItem.hasDesignation	iso-11179:Designation

iso-11179:Designation

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:designation.language	iso-11179:LanguageIdentification
A	iso-11179:designation.sign	iso-11179:Sign
R	iso-11179:designation.conformsTo	iso-11179:NamingConvention
R	iso-11179:designation.definedAs	iso-11179:Definition
R	iso-11179:designation.occursInNamespace	iso-11179:Namespace
R	iso-11179:designation.usedForItem	iso-11179:DesignatableItem

iso-11179:Definition

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:definition.language	iso-11179:LanguageIdentification
A	iso-11179:definition.source	iso-11179:ReferenceDocument
A	iso-11179:definition.text	iso-11179:Text
R	iso-11179:definition.usedForDefinitionHeading	iso-11179:Designation
R	iso-11179:definition.usedForItem	iso-11179:DesignatableItem

iso-11179:Context**iso-11179:NamingConvention**

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:namingConvention.authorityRule	iso-11179:Text
A	iso-11179:namingConvention.lexicalRule	iso-11179:Text
A	iso-11179:namingConvention.scopeRule	iso-11179:Text
A	iso-11179:namingConvention.semanticRule	iso-11179:Text
A	iso-11179:namingConvention.syntacticRule	iso-11179:Text
R	iso-11179:namingConvention.hasConformantDesignation	iso-11179:Designation
R	iso-11179:namingConvention.utilizedBy	iso-11179:Namespace

iso-11179:DefinitionContext

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:definitionContext.acceptability	iso-11179:Acceptability
R	iso-11179:definitionContext.includesRelevantDefinition	iso-11179:Definition
R	iso-11179:definitionContext.occursInScope	iso-11179:Context

iso-11179:DesignationContext

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:designationContext.acceptability	iso-11179:Acceptability
R	iso-11179:designationContext.includesRelevantDesignation	iso-11179:Designation
R	iso-11179:designationContext.occursInScope	iso-11179:Context

5.6 Registration metamodel region (ISO/IEC 11179-3:2013, 8.1)

Following are the mappings of the ISO/IEC 11179-3:2013 Registration classes, attributes, and associations to RDF. Predicates representing attributes (A) and association roles (R) are grouped by their domain.

iso-11179:RegisteredItem (rdfs:subClassOf iso-11179:IdentifiedItem)

	Predicate	Range
R	iso-11179:registeredItem.submittedBy	iso-11179:SubmissionRecord

iso-11179:AdministeredItem (rdfs:subClassOf iso-11179:RegisteredItem)

	Predicate	Range
A	iso-11179:administeredItem.changeDescription	iso-11179:Text
A	iso-11179:administeredItem.creationDate	iso-11179:dateTime
A	iso-11179:administeredItem.explanatoryComment	iso-11179:Text
A	iso-11179:administeredItem.lastChangeDate	iso-11179:dateTime
A	iso-11179:administeredItem.origin	iso-11179:Text
R	iso-11179:administeredItem.attachedTo	iso-11179:AttachedItem
R	iso-11179:administeredItem.stewardedBy	iso-11179:StewardshipRecord

iso-11179:AttachedItem (rdfs:subClassOf iso-11179:RegisteredItem)

	Predicate	Range
R	iso-11179:attachedItem.hasOwner	iso-11179:AdministeredItem

iso-11179:Registrar (rdfs:subClassOf iso-11179:Contact)

	Predicate	Range
A	iso-11179:registrar.identifier	xsd:string
R	iso-11179:registrar.authorizedBy	iso-11179:RegistrationAuthority

iso-11179:RegistrationAuthority (rdfs:subClassOf iso-11179:Organization)

	Predicate	Range
A	iso-11179:registrationAuthority.documentLanguageIdentifier	iso-11179:LanguageIdentification
A	iso-11179:registrationAuthority.registrationAuthorityIdentifier	iso-11179:RegistrationAuthorityIdentifier
R	iso-11179:registrationAuthority.hasRegistrar	iso-11179:Registrar
R	iso-11179:registrationAuthority.hasRegistrationNamespace	iso-11179:Namespace

iso-11179:RegistrationState

	Predicate	Range
A	iso-11179:registrationState.administrativeNote	iso-11179:Text
A	iso-11179:registrationState.administrativeStatus	xsd:string
A	iso-11179:registrationState.effectiveDate	iso-11179:dateTime
A	iso-11179:registrationState.previousState	iso-11179:RegistrationState
A	iso-11179:registrationState.registrationStatus	xsd:string
A	iso-11179:registrationState.unresolvedIssue	iso-11179:Text
A	iso-11179:registrationState.untilDate	iso-11179:dateTime

iso-11179:StewardshipRecord

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:stewardshipRecord.contact	iso-11179:Contact
A	iso-11179:stewardshipRecord.organization	iso-11179:Organization
R	iso-11179:stewardshipRecord.stewards	iso-11179:AdministeredItem

iso-11179:SubmissionRecord

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:submissionRecord.contact	iso-11179:Contact
A	iso-11179:submissionRecord.organization	iso-11179:Organization
R	iso-11179:submissionRecord.submits	iso-11179:RegisteredItem

iso-11179:RegistrySpecification

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:registrySpecification.characterRepertoire	xsd:string
A	iso-11179:registrySpecification.comment	iso-11179:Text
A	iso-11179:registrySpecification.conformanceLevel	xsd:string
A	iso-11179:registrySpecification.context	iso-11179:Context
A	iso-11179:registrySpecification.name	iso-11179:Sign
A	iso-11179:registrySpecification.primaryLanguage	iso-11179:LanguageIdentification
A	iso-11179:registrySpecification.referenceDocumentIdentifierForm	xsd:string
A	iso-11179:registrySpecification.representationClassScheme	iso-11179:ConceptSystem
A	iso-11179:registrySpecification.standard	xsd:string
A	iso-11179:registrySpecification.webAddress	xsd:string

iso-11179:Registration

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:registration.registrationState	iso-11179:RegistrationState
R	iso-11179:registration.administeredItem	iso-11179:AdministeredItem
R	iso-11179:registration.authority	iso-11179:RegistrationAuthority

iso-11179:Reference

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:reference.documentReference	xsd:string
R	iso-11179:reference.referencingItem	iso-11179:ReferenceDocument
R	iso-11179:reference.type	iso-11179:RegisteredItem

5.7 Concepts package (ISO/IEC 11179-3:2013, Clause 9)

The purpose of the Concepts Metamodel Region in ISO/IEC 11179-3:2013 is to describe Concepts (abstract units of knowledge) and the various Relations which might hold among Concepts. Ontologies are supported as Concept_Systems with formal semantics through the use of Assertions.

RDF provides language level support for assertions through subject/predicate/object statements and for relations through predicates. RDFS and OWL provide vocabulary level support to semantically enhance such assertions and relations. SKOS is a vocabulary designed to semantically express concepts and concept systems. For this reason, no RDF mappings are defined for the Concepts package with the exception of two

OWL classes, `iso-11179:Concept` and `iso-11179:ConceptSystem`. Both classes are integrated into the SKOS vocabulary, making the full semantics of SKOS available if implementers choose to instantiate the schema.

- `iso-11179:Concept` is declared `rdfs:subClassOf skos:Concept`
- `iso-11179:ConceptSystem` is declared `rdfs:subClassOf skos:ConceptScheme`

The `iso-11179:Concept` class also provides an anchor as the parent class for the different concept types introduced in the conceptual layer of the Data Description package of the ISO/IEC 11179-3:2013 model.

5.8 Binary Relations package (ISO/IEC 11179-3:2013, Clause 10)

OWL provides direct vocabulary level support to express object properties of binary relations. See [Table 3](#).

Table 3 — OWL Object Properties

Property	Semantics
<code>owl:AsymmetricProperty</code>	If an individual <i>x</i> is connected to an individual <i>y</i> by this property, then <i>y</i> cannot be connected to <i>x</i> by this property.
<code>owl:IrreflexiveProperty</code>	No individual is connected to itself by this property.
<code>owl:ReflexiveProperty</code>	Each individual is connected to itself by this property.
<code>owl:SymmetricProperty</code>	If an individual <i>x</i> is connected to an individual <i>y</i> by this property, then <i>y</i> is also connected to <i>x</i> by this property.
<code>owl:TransitiveProperty</code>	If an individual <i>x</i> is connected to an individual <i>y</i> by this property, and <i>y</i> is connected to an individual <i>z</i> by this property, then <i>x</i> is also connected to <i>z</i> by this property.

5.9 Data Description package (ISO/IEC 11179-3:2013, Clause 11)

Following are the mappings of the ISO/IEC 11179-3:2013 Data Description classes, attributes, and associations to RDF. Predicates representing attributes (A) and association roles (R) are grouped by their domain.

iso-11179:DataElement

	Predicate	Range
A	<code>iso-11179:dataElement.precision</code>	<code>xsd:integer</code>
R	<code>iso-11179:dataElement.exemplifiedBy</code>	<code>iso-11179:DataElementExample</code>
R	<code>iso-11179:dataElement.isInputTo</code>	<code>iso-11179:DataElementDerivation</code>
R	<code>iso-11179:dataElement.isOutput</code>	<code>iso-11179:DataElementDerivation</code>
R	<code>iso-11179:dataElement.represents</code>	<code>iso-11179:DataElementConcept</code>
R	<code>iso-11179:dataElement.uses</code>	<code>iso-11179:ValueDomain</code>

iso-11179:DataElementConcept (rdfs:subClassOf iso-11179:Concept)

	Predicate	Range
R	<code>iso-11179:dataElementConcept.hasObjectClass</code>	<code>iso-11179:ObjectClass</code>
R	<code>iso-11179:dataElementConcept.hasProperty</code>	<code>iso-11179:Property</code>
R	<code>iso-11179:dataElementConcept.providesMeaningFor</code>	<code>iso-11179:DataElement</code>
R	<code>iso-11179:dataElementConcept.uses</code>	<code>iso-11179:ConceptualDomain</code>

iso-11179:ObjectClass (rdfs:subClassOf iso-11179:Concept)

	Predicate	Range
R	<code>iso-11179:objectClass.hasDataElementConcept</code>	<code>iso-11179:DataElementConcept</code>

iso-11179:Property (rdfs:subClassOf iso-11179:Concept)

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:property.hasDataElementConcept	iso-11179:DataElementConcept

iso-11179:ValueDomain

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:valueDomain.datatype	iso-11179:Datatype
A	iso-11179:valueDomain.format	xsd:string
A	iso-11179:valueDomain.maximumCharacterQuantity	xsd:integer
A	iso-11179:valueDomain.unitOfMeasure	iso-11179:UnitOfMeasure
R	iso-11179:valueDomain.hasMeaning	iso-11179:ConceptualDomain
R	iso-11179:valueDomain.isSubdomain	iso-11179:ValueDomain
R	iso-11179:valueDomain.isSuperdomain	iso-11179:ValueDomain
R	iso-11179:valueDomain.providesValuesFor	iso-11179:DataElement

iso-11179:Datatype

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:datatype.annotation	iso-11179:Text
A	iso-11179:datatype.description	iso-11179:Text
A	iso-11179:datatype.name	xsd:string
A	iso-11179:datatype.schemeReference	iso-11179:ReferenceDocument

iso-11179:DescribedValueDomain (rdfs:subClassOf iso-11179:ValueDomain)

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:describedValueDomain.description	iso-11179:Text
R	iso-11179:describedValueDomain.hasMeaning	iso-11179:DescribedConceptualDomain

iso-11179:EnumeratedValueDomain (rdfs:subClassOf iso-11179:ValueDomain)

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:enumeratedValueDomain.hasMember	iso-11179:PermissibleValue

iso-11179:ConceptualDomain (rdfs:subClassOf iso-11179:Concept)

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:conceptualDomain.dimensionality	iso-11179:Dimensionality
R	iso-11179:conceptualDomain.hasRepresentation	iso-11179:ValueDomain
R	iso-11179:conceptualDomain.providesDomainFor	iso-11179:DataElementConcept

iso-11179:DescribedConceptualDomain (rdfs:subClassOf iso-11179:ConceptualDomain)

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:describedConceptualDomain.description	iso-11179:Text
R	iso-11179:describedConceptualDomain.hasRepresentation	iso-11179:DescribedValueDomain

iso-11179:EnumeratedConceptualDomain (rdfs:subClassOf iso-11179:ConceptualDomain)

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:enumeratedConceptualDomain.hasMember	iso-11179:ValueMeaning

iso-11179:PermissibleValue

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:permissibleValue.beginDate	xsd:date
A	iso-11179:permissibleValue.endDate	xsd:date
A	iso-11179:permissibleValue.permittedValue	iso-11179:Value
R	iso-11179:permissibleValue.containingDomain	iso-11179:EnumeratedValueDomain
R	iso-11179:permissibleValue.hasMeaning	iso-11179:ValueMeaning

iso-11179:ValueMeaning (rdfs:subClassOf iso-11179:Concept)

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:valueMeaning.beginDate	xsd:date
A	iso-11179:valueMeaning.endDate	xsd:date
R	iso-11179:valueMeaning.containedIn	iso-11179:EnumeratedConceptualDomain
R	iso-11179:valueMeaning.hasRepresentation	iso-11179:PermissibleValue

iso-11179:MeasureClass

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:measureClass.hasDimensionality	iso-11179:Dimensionality
R	iso-11179:measureClass.hasMemberUnit	iso-11179:UnitOfMeasure

iso-11179:Dimensionality (rdfs:subClassOf iso-11179:Concept)

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:dimensionality.coordinateIndicator	xsd:boolean
R	iso-11179:dimensionality.hasApplicableUnits	iso-11179:MeasureClass

iso-11179:UnitOfMeasure (rdfs:subClassOf iso-11179:Concept)

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:unitOfMeasure.isMemberOf	iso-11179:MeasureClass

iso-11179:DataElementExample

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:dataElementExample.exampleItem	iso-11179:Text
R	iso-11179:dataElementExample.exemplifies	iso-11179:DataElement

iso-11179:DerivationRule

	<i>Predicate</i>	<i>Range</i>
A	iso-11179:derivationRule.notation	iso-11179:Notation
A	iso-11179:derivationRule.specification	iso-11179:Text
R	iso-11179:derivationRule.providesRuleFor	iso-11179:DataElementDerivation

iso-11179:DataElementDerivation

	<i>Predicate</i>	<i>Range</i>
R	iso-11179:dataElementDerivation.applies	iso-11179:DerivationRule
R	iso-11179:dataElementDerivation.derives	iso-11179:DataElement
R	iso-11179:dataElementDerivation.inputs	iso-11179:DataElement

5.10 Elements of ISO/IEC 11179-6

Registration status levels described in ISO/IEC 11179-6:2015, 4.4.2 are represented as instances of iso-11179:RegistrationStatus:

- iso-11179:RegistrationStatus.Application
- iso-11179:RegistrationStatus.Candidate
- iso-11179:RegistrationStatus.Historical
- iso-11179:RegistrationStatus.Incomplete
- iso-11179:RegistrationStatus.PreferredStandard
- iso-11179:RegistrationStatus.Qualified
- iso-11179:RegistrationStatus.Recorded
- iso-11179:RegistrationStatus.Retired
- iso-11179:RegistrationStatus.Standard
- iso-11179:RegistrationStatus.Superseded