INTERNATIONAL STANDARD

ISO/IEC 20944-5

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# Information technology — Metadata Registries Interoperability and Bindings (MDR-IB) —

## Part 5:
## Profiles

*Technologies de l'information — Interopérabilité et liaisons des registres de métadonnées (MDR-IB) —*

*Partie 5: Profils*

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# Contents

# 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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 20944-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

ISO/IEC 20944 consists of the following parts, under the general title *Information technology — Metadata Registries Interoperability and Bindings (MDR-IB)*:

⎯ *Part 1: Framework, common vocabulary, and common provisions for conformance*

⎯ *Part 2: Coding bindings*

⎯ *Part 3: API bindings*

⎯ *Part 4: Protocol bindings*

⎯ *Part 5: Profiles*

# Introduction

This part of ISO/IEC 20944 contains provisions that are common to the profiles, and the profiles themselves.

It is intended that this part of ISO/IEC 20944 will be extended, via amendments or revisions, as additional profiles are established.

# Information technology — Metadata Registries Interoperability and Bindings (MDR-IB) —

## Part 5:
## Profiles

## 1 Scope

The ISO/IEC 20944 series of International Standards describe codings, application programming interfaces (APIs), and protocols for interacting with an ISO/IEC 11179 metadata registry (MDR).

This part of ISO/IEC 20944 specifies the common provisions for profiles using the ISO/IEC 20944 series.

This part of ISO/IEC 20944 specifies mapping of metamodel attributes, as specified in ISO/IEC 11179-3, to identifiers for the purpose of navigating metadata registries.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC Guide 2, *Standardization and related activities — General vocabulary*

ISO/IEC TR 10000-1, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 1: General principles and documentation framework*

ISO/IEC 11179-3:2003, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

ISO/IEC 20944-1:2013, *Information technology — Metadata Registries Interoperability and Bindings (MDR-IB) — Framework, common vocabulary, and common provisions for conformance*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 20944-1 apply.[1]

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[1] Users and implementers of this part of ISO/IEC 20944 may find it useful to reference the terms and definitions from ISO/IEC 20944-1.

      **1**

# 4 Attribute mapping for ISO/IEC 11179-3 MDR metamodel

## 4.1 General

The identifiers in this clause provide a common mapping to the attributes of the ISO/IEC 11179-3 metamodel. Although the identifiers describe a hierarchical path, there is no requirement that the metamodel be organized or implemented in a hierarchical structure.

## 4.2 Value space of labels

The value space of possible labels (i.e., navigable identifiers) is the value space defined by the ISO/IEC 11404 datatype:

```
type character_based_multiple_identifier =
    array (0..*) of ( characterstring(iso-10646) )
```

NOTE    The `characterstring` datatype is used for representing labels, such as metamodel attribute identifiers (e.g., "units_of_measure"), and used for representing array indexes (e.g., the string "0" represents the index of the first element of an array).

## 4.3 Available labels

The value space is the set of `characterstring`s.[2]

## 4.4 Label formation

The ISO/IEC 11179-3 registry metamodel describes a data model (for metadata) in UML notation. The following conventions apply with respect to mapping ISO/IEC 11179-3 metamodel attributes to navigable identifiers that may be used to access the data of the metamodel attribute (i.e., metadata).

### 4.4.1 Semantic provisions

The ISO/IEC 11179-3 metamodel uses a limited set of UML metaobjects (UML features) from the UML notation. The ISO/IEC 11179-3 metamodel employs the following constraints or assumptions:

— A limited set of UML metaobjects are used: classes, attributes, containment, relations, objectified relations, specialization.

— Classes only have attributes and relations; classes do not have methods.

— All attributes are public.

— Specialized classes only use single inheritance.

These UML notational features are transformed as follows:

— UML class notation: UML classes are comprised of UML attributes and UML relations. From the class, this part of ISO/IEC 20944 describes navigation to the attributes and, if navigable, navigation to the relationship.

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[2]    The distinction between <u>possible</u> and <u>available</u> is: the "possible" concerns the value space from which the labels are chosen, while the "available" concerns those ones that are valid. For example, in North America, phone numbers come from a possible list of 10-digit numbers "nnn-nnn-nnnn", but not all possible numbers are available, e.g., numbers whose first digits are 0 or 1 are not available (e.g., "022-222-2222" is not available).

— UML attributes: An attribute is navigated according to the access operations supported by its datatype. For example, an array is accessed by its index; a record is accessed by the labels of its components.

— UML relations: A relation may be navigated from its roles (sides) that support navigation. Objectified relations may be navigated from the relation's roles that support navigation.

— UML containment relations: A containment relation may be navigated from its parent.

— UML relations' role's multiplicity: A cardinality of 0..1 or 1..1 may be navigated directly by the relation role. A cardinality of 0..* or 1..* may be navigated as an array of relations for the particular role.

Other constraints and provisions of the ISO/IEC 11179-3 metamodel are contained in the normative wording of ISO/IEC 11179-3.

Inheritance is simulated by copying all the attributes and relationships of the base type to the subtype, e.g. if "Y" is derived from the base type "X", and "X" has attributes "A" and "B", and relation "C", and "Y" has attributes "D" and "E", then an instance of "Y" has the navigable identifiers "a", "b", "c_relation", "d", and "e".

A conforming implementation shall map the labels defined in this Clause to a conforming ISO/IEC 11179-3 metadata registry

### 4.4.2 Syntactic provisions

The following are syntax requirements

— All identifiers that refer to classes have the suffix "_class" added to the identifier, e.g., the "Representation Class" class, becomes "representation_class_class".

— All identifiers that refer to navigable relations have the suffix "_relation" added to the identifier (e.g., "classifying_relation", "classified_by_relation").

— Containment relationships are represented by the component name (and not "Containing"), e.g., the "Classification Scheme" class contains a "Classification Scheme Item" class which is represented by "classification_scheme_membership"; in other words, if "X" represents an instance of the "Classification Scheme" class, then "X/classification_scheme_membership" represents an instance(s) of the "Classification Scheme Item" (see below for more information on indexing notation for this particular class).

— Attributes of objectified relationships are accessed via the "_relation" access token, e.g., if "X" is an instance of an "administered_item_class", then "X/having_relation/P/_relation/terminological_entry" represents a component of the "terminological_entry" objectified relation class.

— Attributes and relationships with cardinality "[1..1]" are represented without indexing.

— Attributes and relationships with cardinality "[0..1]" are represented without indexing. Note: In the case of zero instances, it is assumed that the implementation will have some technique for determining whether or not the optional feature is present.

— Attributes and relationships with other cardinalities (e.g., "[0..*]", "[1..*]") are accessed via an indexing mechanism, e.g., if "X" is an instance of the "language_section_class", then "X/name_entry/0", "X/name_entry/1", "X/name_entry/2", etc., may represent the identifiers associated with each of the "name_entry"s.

— The slash character "/" is used to separate components of a navigation identifier. Note that individual bindings may use different component separators and other syntax conventions.

### 4.4.3 Lexical provisions

The following are lexical provisions

— All identifier are transformed to lower case, spaces are transformed to underscores, and other punctuation is removed, e.g., "Context (for administered item)" becomes "context_for_administered_item".

— All identifiers that refer to classes have the suffix "_class" added to the identifier, e.g., the "Representation Class" class, becomes "representation_class_class".

— Containment relationships are represented by the component name (and not "Containing"), e.g., the "Classification Scheme" class contains a "Classification Scheme Item" class which is represented by "classification_scheme_membership"; in other words, if "X" represents an instance of the "Classification Scheme" class, then "X/classification_scheme_membership" represents an instance(s) of the "Classification Scheme Item" (see below for more information on indexing notation for this particular class).

— Navigable relationships are represented by their relationship names (e.g., "Classifying", "Classified By") and not their relationship type (e.g., "administered_item_classification").

— All identifiers that refer to navigable relations have the suffix "_relation" added to the identifier (e.g., "classifying_relation", "classified_by_relation").

### 4.4.4 Lifecycle

Not applicable.

### 4.4.5 Re-use

Not applicable.

## 4.5 Resolving conflicts

Not applicable.

## 4.6 Additional provisions

### 4.6.1 Mandatory top level identifiers

The following identifiers shall be accessible at the top level navigation of an administered item within a registry; these identifiers represent starting points for navigating the registry metamodel.

```
administered_item_class
classification_scheme_class
conceptual_domain_class
enumerated_conceptual_domain_class
non_enumerated_conceptual_domain_class
context_for_administered_item_class
data_element_class
derivation_rule_class
data_element_concept_class
object_class_class
property_class
representation_class_class
value_domain_class
enumerated_value_domain_class
non_enumerated_value_domain_class
registration_authority_class
organization_class
```

Example

If "X" represents the navigation starting point of an administered item, then the following sample navigation identifiers may be used:

```
X/administered_item_class/administered_item_administration_record/
administered_item_identifier

X/value_domain_class/value_domain_unit_of_measure/unit_of_measure_precision
```

### 4.6.2 Optional top level identifiers

The following identifiers may be accessible (i.e., they are optional) at the top level navigation of an administered item within a registry.

```
stewardship_class
submission_class
registrar_class
reference_document_class
registration_authority_identifier_class
language_identification_class
contact_class
item_identifier_class
administration_record_class
terminological_entry_class
language_section_class
designation_of_administered_item_class
definition_of_administered_item_class
classification_scheme_item_class
classification_scheme_item__replationship_class
conceptual_domain_relationship_class
concept_class
concept_relationship_class
value_domain_relationship_class
value_meaning_class
permissible_value_class
unit_of_measure_class
datatype_class
data_element_concept_relationship_class
data_element_example_class
data_element_derivation_class
```

## 4.7 Identifier mappings

The follow subclauses are the identifier mappings for each class defined in ISO/IEC 11179-3. The notation "#index" indicates a parameter that is to be replaced with an index. The notation "// optional" indicates a navigation identifier that is optional with respect to conformance.

NOTE    The ordering of this subclause is intended to approximate the ordering of definitions in ISO/IEC 11179-3:2003, Clause 4.

### 4.7.1 Administered item class

```
administered_item_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
```

### 4.7.2   Registration authority class

```
registration_authority_class:
registration_authority_identifier
documentation_language_identifier
represented_by_relation/#index
registering_relation/#index  // optional
```

### 4.7.3   Organization class

```
organization_class:
registration_authority_identifier
documentation_language
represented_by_relation
organization_name
organization_mail_address
administering_relation/#index // optional
submitting_relation/#index // optional
providing_relation/#index // optional
```

### 4.7.4   Stewardship class

```
stewardship_class:
stewardship_contact
```

### 4.7.5   Submission class

```
submission_class:
submission_contact
```

### 4.7.6   Registrar class

```
registrar_class:
registrar_identifier
registrar_represents_relation
registrar_contact
```

### 4.7.7   Reference document class

```
reference_document_class:
reference_document_identifier
reference_document_type_description
reference_document_language_identifier/#index
reference_document_title
provided_by_relation/#index
describing_relation/#index  // optional
```

### 4.7.8   Registration authority identifier class

```
registration_authority_identifier_class:
international_code_designator
organization_identifier
organization_part_identifier
opi_source
```

### 4.7.9   Language identification class

```
language_identification_class:
language_identifier
country_identifier
```

### 4.7.10 Contact class

```
contact_class:
contact_name
contact_title
contact_information
```

### 4.7.11 Item identifier class

```
item_identifier_class:
item_registration_authority_identifier
data_identifier
version
```

### 4.7.12 Administration record class

```
administration_record_class:
administered_item_identifier
registration_status
administrative_status
creation_date
last_change_date
effective_date
until_date
change_description
administrative_note
explanatory_comment
unresolved_issue
origin
```

### 4.7.13 Terminological entry class

```
terminological_entry_class:
terminological_entry/#index
```

### 4.7.14 Context for administered item class

```
context_for_administered_item_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index   // optional
context_description
context_description_language_identifier
```

### 4.7.15 Language section class

```
language_section_class:
language_section_language_identifier
name_entry/#index
definition_entry/#index
```

### 4.7.16 Designation of administered item class

```
designation_of_administered_item_class:
name
pererred_designation
specifically_using_relation  // optional
```

### 4.7.17 Definition of administered item class

```
definition_of_administered_item_class:
definition_text
preferred_definition
definition_source_reference
specifically_using_relation  // optional
```

### 4.7.18 Classification scheme class

```
classification_scheme_class:
administered_item_administration_record_class
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
classification_scheme_type_name
classification_scheme_membership/#index
```

### 4.7.19 Classification scheme item class

```
classification_scheme_item_class:
classification_scheme_item_type_name
classification_scheme_item_value
classification_scheme_association_relation/#index
classification_scheme_association_relation/#index/_relation/classification_scheme_item
_relationship_type_description
classifying_relation/#index
```

### 4.7.20 Conceptual domain class

```
conceptual_domain_class:
administered_item_administration_record_class
dimensionality
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
related_to_relation/#index
related_to_relation/#index/_relation/data_element_concept_relationship_type_descriptio
n
related_to_relation/#index/_relation/concept_domain_relationship_type_description
```

### 4.7.21 Data element concept class

```
data_element_concept_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
data_element_concept_object_class
object_class_qualifier
data_element_concept_property
property_qualifier
expressed_by_relation  // optional
```

### 4.7.22 Property class

```
property_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
```

### 4.7.23 Object class class

```
object_class_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
```

### 4.7.24 Concept class

```
concept_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
using_relation/#index
using_relation/#index/_relation/administered_item_administration_record
using_relation/#index/_relation/registered_by_relation
```

```
using_relation/#index/_relation/administered_by_relation/#index
using_relation/#index/_relation/administered_by_relation/#index/_relation/stewardship
using_relation/#index/_relation/submitted_by_relation/#index
using_relation/#index/_relation/submitted_by_relation/#index/_relation/submission
using_relation/#index/_relation/having_relation/#index
using_relation/#index/_relation/having_relation/#index/_relation/terminological_entry/
#index
using_relation/#index/_relation/classified_by_relation/#index  // optional
using_relation/#index/_relation/concept_relationship_type_description
used_in_relation/#index // optional
used_in_relation/#index/_relation/registered_by_relation
used_in_relation/#index/_relation/administered_by_relation/#index
used_in_relation/#index/_relation/administered_by_relation/#index/_relation/stewardshi
p
used_in_relation/#index/_relation/submitted_by_relation/#index
used_in_relation/#index/_relation/submitted_by_relation/#index/_relation/submission
used_in_relation/#index/_relation/having_relation/#index
used_in_relation/#index/_relation/having_relation/#index/_relation/terminological_entr
y/#index
used_in_relation/#index/_relation/classified_by_relation/#index  // optional
used_in_relation/#index/_relation/concept_relationship_type_description
```

## 4.7.25  Concept relationship class

```
concept_relationship_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
concept_relationship_type_description
```

## 4.7.26  Enumerated conceptual domain class

```
enumerated_conceptual_domain_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
represented_by_value_domain_relation/#index  // optional
value_meaning_set/#index
```

## 4.7.27  Value meaning class

```
value_meaning_class:
value_meaning_identifier
value_meaning_description
value_meaning_begin_date
value_meaning_end_date
used_in_relation/#index  // optional
```

### 4.7.28 Permissible value class

```
permissible_value_class:
permissible_value_begin_date
permissible_value_end_date
permissible_value_has_value_meaning_relation
permissible_value_has_value_relation
```

### 4.7.29 Value domain class

```
value_domain_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
value_domain_datatype
value_domain_unit_of_measure
value_domain_maximum_character_quantity
value_domain_format
representing_conceptual_domain_relation
typed_by_relation  // optional
represented_by_data_element_relation#index  // optional
```

### 4.7.30 Enumerated value domain class

```
enumerated_value_domain_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
value_domain_datatype
value_domain_unit_of_measure
value_domain_minimum_character_quantity
value_domain_data_format
representing_conceptual_domain_relation
typed_by_relation
represented_by_data_element_relation#index  // optional
permissible_value_set/#index
```

### 4.7.31 Non enumerated value domain class

```
non_enumerated_value_domain_class:
administered_item_administration_record
non_enumerated_value_domain_description
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
```

```
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
value_domain_datatype
value_domain_unit_of_measure
value_domain_minimum_character_quantity
value_domain_data_format
typed_by_relation
represented_by_data_element_relation#index // optional
representing_conceptual_domain_relation
representing_non_enumerated_conceptual_domain_relation
```

### 4.7.32  Non enumerated conceptual domain class

```
non_enumerated_conceptual_domain_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
dimensionality
represented_by_value_domain_relation/#index  // optional
non_enumerated_conceptual_domain_description
represented_by_non_enumerated_value_domain_relation/#index  // optional
```

### 4.7.33  Representation class class

```
representation_class_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
typing_value_domain_relation/#index  // optional
typing_data_element_relation/#index  // optional
```

### 4.7.34  Unit of meaure class

```
unit_of_measure_class:
unit_of_measure_name
unit_of_measure_precision
```

### 4.7.35  Datatype class

```
datatype_class:
datatype_name
datatype_description
datatype_scheme_reference
datatype_annotation
```

### 4.7.36  Data element class

```
data_element_class:
administered_item_administration_record
registered_by_relation
administered_by_relation/#index
administered_by_relation/#index/_relation/stewardship
submitted_by_relation/#index
submitted_by_relation/#index/_relation/submission
having_relation/#index
having_relation/#index/_relation/terminological_entry/#index
classified_by_relation/#index  // optional
expressed_by_relationship  // optional
representation_class_qualifier
data_element_precision
expressing_relation
representing_relation
typed_by_relation // optional
exemplified_by_relation/#index // optioinal
derived_from_relation/#index // optional
input_to_relation/#index  // optional
```

### 4.7.37  Data element example class

```
data_element_example_class:
examplifying_relation
data_element_example_item
```

### 4.7.38  Data element derivation class

```
data_element_derivation_class:
deriving_relation
applying_relation
inputing_relation/#index
```

### 4.7.39  Data element derivation rule class

```
data_element_derivation_rule_class:
derivation_rule_specification
applied_to_relation/#index  // optional
```

## 4.8   Conformance label

The following label indicates conformity to this Clause: "ISO/IEC 20944-5/P/URI".

The location of the placement of conformance labels is outside the scope of this International Standard.

# 5   Profile for ISO/IEC 11179-3 MDR metamodel

## 5.1   General

The ISO/IEC 20944 series of International Standards describe codings, APIs, and protocols for interacting with an ISO/IEC 11179 metadata registry (MDR).

This part of ISO/IEC 20944 specifies mapping of metamodel attributes, as specified in ISO/IEC 11179-3, to identifiers for the purpose of navigating metadata registries.