



DPC: 25/30466511 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 29002

Industrial automation systems and integration — Exchange of characteristic data

ICS: 25.040.40

ISO/TC 184/SC 4

Secretariat: **ANSI**

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This document is circulated as received from the committee secretariat.

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Phone: +41 22 749 01 11
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Contents

Page

Foreword	v
Introduction	vii
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Fundamental principles	10
4.1 Exchange of characteristic data	10
5 Basic datatypes to support exchange of characteristic data	17
5.1 Overview of datatypes to support exchange of characteristic data	17
5.2 Exchange file format for basic datatypes	19
5.2.1 Overview of the format for basic datatypes	19
5.2.2 Specified datatypes for exchange of characteristic data	19
6 Identification scheme	21
6.1 Purpose of the scheme	21
6.2 Use of the scheme	22
6.2.1 General considerations	22
6.2.2 Using the scheme as a resource for other standards	22
6.3 Administered items	23
6.4 Key characteristics of identifiers for administered items	25
6.4.1 Identification of administered items	25
6.4.2 Overall structure of the IRDI	25
6.4.3 Character set for the IRDI	26
6.4.4 Length of the IRDI	27
6.4.5 Representation of the IRDI	27
6.5 Registration authority identifier	27
6.5.1 Elements of registration authority identifiers	27
6.5.2 representation of registration authority identifiers	28
6.6 Data identifier	29
6.6.1 Elements of data identifiers	29
6.6.2 Representation of data identifiers	31
6.7 Version identifier	32
7 Concept dictionary access	32
7.1 Overview of concept dictionary access	32
7.2 Concept dictionary terminology reference model	35
7.2.1 Overview of the concept dictionary terminology reference model	35
7.2.2 Specified entities for the concept dictionary terminology reference model	36
8 Characteristic data exchange	43
8.1 Overview of characteristic data exchange	43
8.2 Exchange file format for characteristic data	46
8.2.1 Overview of the format for characteristic data	46
8.2.2 Specified entities for exchanging characteristic data	46
8.3 Values in characteristic data	49
8.3.1 Overview of the format for values in characteristic data	49
8.3.2 Specified types for representing values in characteristic data	50
9 Concept dictionary resolution services	62
9.1 Overview of concept dictionary resolution services	62
9.2 Principles for concept dictionary resolution services	63
9.2.1 Identification	63
9.2.2 Types of service	63
9.2.3 Getter methods	63
9.3 Service descriptions and requirements	64

9.3.1	Location service.....	64
9.3.2	Terminology service.....	65
9.3.3	Ontology service.....	66
9.4	Data models for concept dictionary resolution services.....	68
9.4.1	Overview of the data models for concept dictionary resolution services.....	68
9.4.2	Core data model for concept dictionary resolution services.....	69
9.4.3	Location service data model.....	70
9.4.4	Terminology service data model.....	71
9.4.5	Ontology service data model.....	74
9.5	Interface specifications.....	75
9.5.1	Overview of the interface specifications.....	75
9.5.2	Location service.....	75
9.5.3	Terminology service.....	76
9.5.4	Ontology service.....	83
9.6	Search patterns.....	87
9.6.1	Search patterns general.....	87
9.6.2	Search pattern for full text.....	88
9.6.3	Search pattern wildcards.....	88
10	Query for characteristic data.....	89
10.1	Overview of query for characteristic data.....	89
10.2	Exchange file format for query.....	93
10.2.1	Overview of the format for query.....	93
10.2.2	Specified entities for query.....	94
11	Conformance requirements.....	101
11.1	CC1: conformance requirement for basic datatypes.....	101
11.2	CC2: conformance requirement for identification scheme.....	101
11.3	CC3: conformance requirement for concept dictionary access.....	101
11.4	CC4: conformance requirement for characteristic data exchange.....	102
11.5	CC5: conformance requirement for concept dictionary resolution services.....	102
11.6	CC6 and CC7: conformance requirements for query of characteristic data.....	102
Annex A (informative) Information object registration.....		103
Annex B (informative) Computer interpretable listings.....		104
Annex C (informative) Generation of XML schema from UML model.....		106
Annex D (informative) Relation to the ISO 13584, ISO 22745 and IEC 61360 series.....		108
Annex E (informative) Usage guidance for source_location.....		109
Annex F (informative) Referencing metadata from the characteristic data model.....		111
Annex G (informative) Using the model of characteristic data.....		112
Annex H (informative) The role of property value pairs.....		117
Annex I (informative) Usage guide for get_concept_model.....		120
Annex J (informative) XSD and JSON parameter names.....		124
Annex K (informative) The role of data dictionary models in achieving semantic interoperability.....		125
Annex L (informative) Cross tables of clauses and figures from withdrawn documents.....		130
Bibliography.....		138

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*

This document cancels and replaces ISO/TS 29002-4:2009, ISO/TS 29002-5:2009, ISO/TS 29002-6:2010, ISO/TS 29002-10:2009, ISO/TS 29002-20:2010 and ISO/TS 29002-31:2009, which have been technically revised.

The main changes are as follows:

- contents of ISO/TS 29002-4:2009 Industrial automation systems and integration — Exchange of characteristic data: — Basic entities and types, were incorporated into [Clause 5](#), [Annex A](#), [Annex B](#) and [Annex C](#) of this document. The conformance requirements are specified in [clause 11](#);
- contents of ISO/TS 29002-5:2009 Industrial automation systems and integration — Exchange of characteristic data: — Identification scheme, were incorporated into [Clause 6](#), [Annex A](#), [Annex B](#) and [Annex D](#) of this document. The conformance requirements are specified in [clause 11](#);
- contents of ISO/TS 29002-6:2010 Industrial automation systems and integration — Exchange of characteristic data: — Concept dictionary terminology reference model, were incorporated into [Clause 7](#), [Annex A](#), [Annex B](#), [Annex C](#) and [Annex E](#) of this document. The conformance requirements are specified in [clause 11](#);
- contents of ISO/TS 29002-10:2009 Industrial automation systems and integration — Exchange of characteristic data: — Characteristic data exchange format, were incorporated into [Clause 8](#), [Annex A](#), [Annex B](#), [Annex F](#), [Annex G](#) and [Annex H](#) of this document. The conformance requirements are specified in [clause 11](#);
- contents of ISO/TS 29002-20:2010 Industrial automation systems and integration — Exchange of characteristic data: — Concept dictionary resolution services, were incorporated into [Clause 9](#), [Annex A](#), [Annex B](#) and [Annex I](#) of this document. The conformance requirements are specified in [clause 11](#);

ISO/DIS 29002:2025(en)

- contents of ISO/TS 29002-31:2009 Industrial automation systems and integration — Exchange of characteristic data: — Query for characteristic data, were incorporated into [Clause 10](#), [Annex A](#) and [Annex B](#) of this document. The conformance requirements are specified in [clause 11](#);
- change in provisions to allow use of new technologies for the exchange of characteristic data;
- clarification regarding the operation of the location service;
- alternative process in the absence of any location service;
- minor update to the identification scheme to allow for more flexible implementation;
- change in notation style of the figures to ensure consistency and readability.

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

Characteristic data are a valuable asset across the industrial sector. These data describe the products and services created, sold and used by organizations. Such data are most useful when organizations exchange and share the data without loss of meaning. Being useful specifically involves improving decision making about the described products and services.

The portfolio of international standards includes various data standards that support exchange and sharing of characteristic data. This support is provided by each standard specifying a capability to represent characteristic data. The standards include the ISO 13399 series^[11], the ISO 13584 series^[12], the ISO 15926 series^[14], the ISO 18101 series^[16], the ISO 22745 series^[19], the IEC 61360 series^[23] including the IEC Common Data Dictionary^[30], and the IEC 62656 series^[25].

While each standard serves a distinct purpose within the wide range of use cases in the industrial sector, the diversity also disrupts reuse of characteristic data across those use cases. Each standard does, however, recognize a consistent theme: a concept dictionary provides the common ground on which organizations can build coherent collections of characteristic data. Such dictionaries serve as a definitive, reusable external reference describing the concepts that give meaning to characteristic data.

Some standards label a concept dictionary as a product ontology but the core capabilities are the same.

The ontology service specified in this document can be used to retrieve representation forms including a product ontology that conforms to ISO 13584 32 and an identification guide information that conforms to ISO/TS 22745 30.

This document establishes the foundation for building interoperability between standards that specify a capability to represent characteristic data. This foundation consists of elements including:

- conceptual information data models and exchange formats;
- a format for an identification scheme;
- an interface for retrieving information from a concept dictionary;
- capabilities for a location service a terminology service and an ontology service;
- twenty schemas, in Extensible Markup Language (XML)^[31] and OpenAPI Specification (OAS) format^[43] (represented in JavaScript Object Notation (JSON)^[32]) (see [Annex B](#) for instructions on how to download electronic versions of the schemas from the ISO website)..

These elements can be used by organizations either

- as is, that is without any model-specific restrictions in combination with other standards including the ISO 13584 series and the ISO 22745 series or
- according to special adaptations that are defined by the respective standard to tailor the use of a format or functionality to the specific requirements of that standard.

The data models in particular address the role of concepts in specifying the preferred common interpretation of terminological items. This common interpretation establishes the items as being semantically equivalent. These items are terms, abbreviations, definitions, graphical representations (images) and symbols. The models enable organizations to combine items from different sources and to collate coherent collections of characteristic data. These sources are typically ISO, IEC or other bodies that operate consensus-based processes to perform terminology work.

In setting up a concept dictionary, organizations do not need to repeat the effort of developing the source terminological items.

By establishing semantic equivalence, a concept dictionary can also function as a thesaurus. This function can integrate communities who either use colloquial terms or different natural languages.

The models also contain a concept equivalence relationship to support a further level of integration and data retrieval. This relationship allows organizations to identify the equivalence of concepts that are represented by pre-existing data records.

In this document, the model for a data dictionary and the format for an identification scheme each reflect the respective requirement for such objects in the ISO 8000 series^[3] for data quality, as illustrated by the data architecture in ISO 8000 1:2022, Figure 2.

By implementing this standard, organizations will deliver the following benefits:

- even when they are familiar with a different term, users more readily identify the correct applicable concept when they are creating new data records, reducing the risk of creating duplicate records;
- improving the quality of characteristic data;
- no loss of meaning when exchanging characteristic data;
- different parties being able to continue using different preferred terms locally for the same concept;
- interoperability between computer systems that perform processing of characteristic data;
- interoperability across all phases of the data and product life cycles.

Industrial automation systems and integration — Exchange of characteristic data

1 Scope

This document is a common resource available to assist with the interoperability of characteristic data between various industrial data standards, such as the ISO 13399 series^[11], the ISO 13584 series^[12], the ISO 15926 series^[14], the ISO 18101 series^[16], the ISO 22745 series^[19], the IEC 61360 series^[23] including the IEC Common Data Dictionary^[30] and IEC 62656 series^[25].

This document specifies a set of resources that enable organizations to use concept dictionaries as the basis for unambiguous exchange of characteristic data.

The following are within the scope of this document:

- fundamental principles for the exchange of characteristic data and for data dictionaries and ontologies;
- a conceptual model for basic entities and types;
- an exchange format for basic entities and types;
- data elements for identification of objects described by a concept dictionary, where those objects include concepts and their associated concept information elements;
- syntax of an identifier of objects described by a concept dictionary;
- rules regarding compatibility of restricted schemas with this document;
- a conceptual model for dictionaries of concepts and their defining terminological data;
- an exchange format for terminological data that can be fetched via a concept dictionary resolution service (CDRS);
- a conceptual model for characteristic data;
- an exchange format for characteristic data;
- a specification of a mechanism to resolve a unique concept identifier to its service provider;
- a specification of an identification scheme and identifier format for retrievable objects in a concept dictionary;
- a specification of a mechanism to retrieve the terminological data associated with a concept and other objects from the concept dictionary terminology reference model, given the identifier of the concept or object;
- a specification of a mechanism to search for concepts and other objects from the concept dictionary terminology reference model, using a set of search patterns and parameters;
- a specification of a mechanism to retrieve the ontological description of a concept, given the identifier of the concept;
- Web Services Definition Language (WSDL)^[33] and Simple Object Access Protocol (SOAP)^[34] binding of the specified services;
- a query for characteristic data of items that have a given supplier identification;
- a query for supplier identification of items that have a given set of characteristic data;

- a query for characteristic data and supplier identification of items that match a search expression;
- a query to supply missing characteristic data.

The formats in this document provide interoperability between implementations of the ISO 13584 series and the ISO 22745 series. These formats also have more general applicability.

This document serves as a generic resource that can be restricted through implementation profiles by standards that reference it. It can also be implemented without restriction.

The following is outside of the scope of this document:

- rules specific to the ISO 13584 series or the ISO 22745 series.

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 639 (all parts), *Code for individual languages and language groups*

ISO 3166 (all parts), *Codes for the representation of names of countries and their subdivisions*

ISO 4217, *Codes for the representation of currencies*

ISO/IEC 6523 (all parts), *Information technology — Structure for the identification of organizations and organization parts*

ISO/IEC 9075-2, *Information technology — Database languages SQL — Part 2: Foundation (SQL/Foundation)*

3 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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

concept

unit of thought

EXAMPLE “automobile”, “colour”, “red” and “metre” are all concepts.

3.2

concept identifier

globally unique identifier of a *concept* (3.1)

Note 1 to entry: A *concept dictionary* (3.9) uses a concept identifier for each concept in the dictionary.

Note 2 to entry: Concept identifiers are the metadata that enable unambiguous exchange of characteristic data. This document specifies the *international registration data identifier* (3.22) as the appropriate type of concept identifier to achieve such exchange.

3.3

concept information element

object (3.12) for which data has been recorded as a contribution to the description of a *concept* (3.1)

EXAMPLE An *image* (3.5), a symbol, an *abbreviation* (3.6), a *term* (3.7), an identifier, a source document, the location of a source document on the internet.

Note 1 to entry: Concepts and concept information elements are both recorded in a *concept dictionary* (3.9).

3.4

definition

representation of a *concept* (3.1) by an expression that describes it and differentiates it from related concepts

[SOURCE: ISO 1087:2019, 3.3.1]

3.5

image

representation of a *concept* (3.1), where the representation is primarily graphic

Note 1 to entry: An image may contain text.

[SOURCE: ISO 22745-2:2010, 14.8]

3.6

abbreviation

designation that is formed by omitting parts from its full form and represents the same *concept* (3.1)

Note 1 to entry: Abbreviations may be created by removing individual words or may be acronyms, initialisms or clipped *terms* (3.7).

3.7

term

verbal designation of a *concept* (3.1) in a specific domain and with a particular language

EXAMPLE “automobile”, “colour”, “red” and “metre” are all terms that designate concepts.

3.8

concept dictionary entry

description of a *concept* (3.1) containing, at a minimum, a *concept identifier* (3.2), a *term* (3.7) and a *definition* (3.4)

Note 1 to entry: The description may consist of just a term and definition, but it may also contain other *concept information elements* (3.3).

3.9

concept dictionary

collection of *concept dictionary entries* (3.8) where the dictionary enables lookup by *concept identifier* (3.2)

3.10

administered item

item for which a *concept dictionary* (3.9) may contain data and may also record administrative information

Note 1 to entry: Administered items include *concepts* (3.1) and *concept information elements* (3.3).

3.11

concept equivalence

semantic equivalence

relation between designations in different natural languages representing the same *concept* (3.1)

Note 1 to entry: In terminological systems, two concepts are (semantically) equivalent if their domain of meaning overlaps and their semantic *definitions* (3.4) are interpreted as identical.

Note 2 to entry: In the context of terminological resources, equivalence and semantic equivalence are often considered as synonyms.

3.12

object

anything perceivable or conceivable

EXAMPLE The radial flow centrifugal pump with serial number AX52386 is an object. Its general structure is defined by the radial flow centrifugal pump *class* (3.13).

Note 1 to entry: Objects can be material (e.g. “engine”, “sheet of paper”, “diamond”), immaterial (e.g. “conversion ratio”, “project plan”) or imagined (e.g. “unicorn”, “scientific hypothesis”).

[SOURCE: ISO 1087:2019, 3.1.1, modified — Example has been added.]

3.13

class

abstraction of a set of similar *objects* ([3.12](#))

3.14

property

quality or feature of an *object* ([3.12](#))

[SOURCE: ISO 22745-2:2010, 2.2]

3.15

property value pair

instance of a specific value together with an identifier for a *concept dictionary entry* ([3.8](#)) that defines a *property* ([3.14](#))

3.16

product ontology

model of product knowledge, made by a formal and consensual representation of the *concepts* ([3.1](#)) of a product domain in terms of characterization *classes* ([3.13](#)), class relations and *properties* ([3.14](#))

EXAMPLE 1 The IEC Common Data Dictionary,^[30] is a reference dictionary for electric components and, thus, is a product ontology for electric components. This ontology conforms to the common dictionary model specified by the ISO 13584^[12] and IEC 61360^[23] series.

EXAMPLE 2 A corporate reference dictionary is agreed upon by experts designated by management on behalf of the organization.

Note 1 to entry: Product ontologies are based on a class-instance model that makes it possible to recognize and to designate the sets of products, called characterization classes, that have a similar function (e.g. ball bearing, capacitor), but also to discriminate within a class the various subsets of products, called instances, that are considered as identical. The ISO/IEC Guide 77^[29] recommends using the rules defined in ISO 1087-1 when formulating designation and *definitions* ([3.4](#)) of characterization classes. Instances have no definitions. They are designated by the class to which they belong and a set of *property value pairs* ([3.15](#)).

Note 2 to entry: Ontologies are not concerned with words, but with concepts, independent of any particular language.

Note 3 to entry: Consensual means that the conceptualization is agreed upon in some community.

Note 4 to entry: The ISO/IEC Guide 77 series recommends the ontology is formal by being machine interpretable, ensuring some level of machine reasoning be possible over the ontology, e.g. consistency checking.

Note 5 to entry: Identified means that each ontology characterization class and property is associated with a globally unique identifier, making it possible to reference this concept from any context.

Note 6 to entry: For a data model for ontology, the ISO/IEC Guide 77 series recommends using the common dictionary model specified by the ISO 13584 and IEC 61360 series. This dictionary mode is specified by ISO 13584-42 and IEC 61360-2.

Note 7 to entry: The ISO/IEC Guide 77 series uses the term “reference dictionary for the domain” to indicate a product ontology addressing a particular product domain and conforming to the common dictionary model specified by the ISO 13584 and IEC 61360 series.

Note 8 to entry: ISO/IEC 19763-3:2010 defines an ontology as a “specification of concrete or abstract things, and the relationships among them, in a prescribed domain of knowledge” and notes that these specifications should be computer processable

Note 9 to entry: ISO 13584-32:2010 specifies an XML schema for representing data according to the ISO 13584 data model. This enables the exchange of both ontologies compliant with the common ISO 13584/IEC61360 model. Such an exchange context is called an OntoML library.

Note 10 to entry: ISO/TS 29002-5 and ISO 29002-10 are both listed as normative references in ISO 13584-32:2010. The content of ISO/TS 29002-5 is updated as clause 6 of this document, and the content of ISO/TS 29002-10 is updated as [clause 8](#) of this document.

[SOURCE: ISO/IEC Guide 77-2:2008, 2.17, modified — Examples and Notes to entry have been refined.]

3.17 characteristic

unit of thought that corresponds to *properties* ([3.14](#)) that are common to a set of *objects* ([3.12](#))

[SOURCE: ISO 22745-2:2010, 9.1]

3.18 characteristic data

description of an entity by the *class* ([3.13](#)) to which it belongs and a set of *property* ([3.14](#)) values

EXAMPLE The item “Socket Head Hex Cap Screw — ISO 4762 Stainless Steel 316, M12 x 20 appears in a manufacturer's catalogue. It may be described as:

- class: socket head hexagon cap screw;
- property values: [standard, ISO 4762]; [material specification, 316 Stainless Steel (Molybdenum content 2-3 % and nickel content 10-14 %)]; [diameter, 12,00 mm]; [thread pitch, 1,75 mm]; [length, 20,00 mm].

In actual characteristic data, the first element of each bracketed pair would be an identifier for a data dictionary entry. In this example, the elements are shown decoded for clarity.

Note 1 to entry: The ISO 13584 series, the ISO 15926 series, the ISO 22745 series, the ISO 13399 series and this document all specify the representation of characteristic data in their data models.

3.19 formal syntax

specification of the valid sentences of a formal language using a formal grammar

EXAMPLE 1 An XML document type definition (DTD) is a formal syntax.

EXAMPLE 2 ISO 10303-21, contains a formal syntax in Wirth Syntax Notation (WSN) for ISO 10303 physical files.

Note 1 to entry: A formal language is computer-interpretable.

Note 2 to entry: Formal grammars are usually Chomsky context-free grammars.

Note 3 to entry: Variants of Backus-Naur Form (BNF) such as Augmented Backus-Naur Form (ABNF) and Wirth Syntax Notation (WSN) are often used to specify the syntax of computer programming languages and data languages.

[SOURCE: ISO 8000-2:2020, 3.9.1]

3.20 data specification identification guide part ontology

rules for describing items belonging to a particular *class* ([3.13](#)) using entries from a *concept dictionary* ([3.9](#)) and reference to a specific *formal syntax* ([3.19](#))

Note 1 to entry: identification guide (IG) is defined as a “data specification that is in the syntax specified in ISO/TS 22745-30 and that uses concept identifiers from an open technical dictionary”.

[SOURCE: ISO 22745-2:2010, 23.2]

Note 2 to entry: an identification guide is sometime referred to as a template of properties and rules

[SOURCE: ISO 22745-2:2010, 23.2]

Note 3 to entry: *product ontology* ([3.16](#)), *part ontology* and *ontology* are grouped as synonyms in ISO 13584-32:2010(en), 3.17

3.21

item of supply

class ([3.13](#)) of substitutable goods or services that fulfil a fit, form or function defined by a buyer

[SOURCE: ISO 22745-2:2010, 22.1]

3.22

international registration data identifier

IRDI

internationally unique identifier for an identified item in a *concept dictionary* ([3.9](#))

3.23

registration authority

organization responsible for a *concept dictionary* ([3.9](#))

3.24

registration authority identifier

identifier assigned to a *registration authority* ([3.23](#))

3.25

issuing organization

IO

body that assumes responsibility for the administration of a specific organization identification scheme

[SOURCE: ISO/IEC 6523-2: 1998, 3.1]

3.26

International Code Designator

ICD

data element used to uniquely identify an organization identification scheme

[SOURCE: ISO/IEC 6523-1:1998, 3.8]

3.27

organization identifier

identifier assigned to an organization within an organization identification scheme, and unique within that scheme

[SOURCE: ISO/IEC 6523-1:1998, 3.10]

3.28

organization part identifier

OPI

identifier allocated to a particular organization part

[SOURCE: ISO/IEC 6523-1:1998, 3.11]

3.29

organization part identifier source

OPIS

data element used to specify the source for the organization part identifier

[SOURCE: ISO/IEC 6523-1:1998, 3.12, modified — "indicator" was removed from the end of the term]

3.30

additional information

AI

data element used to distinguish multiple dictionaries produced by the same organization

EXAMPLE The IEC Common Data Dictionary [51], is a common repository with data dictionaries for all ISO and IEC industrial/technical related-domains. The additional information data element identifies the source standard.

3.31

code space

domain within which each code denotes a single meaning

Note 1 to entry: This document assigns a distinct code space for each *administered item* (3.10).

3.32

code space identifier

CSI

unique identifier for a *code space* (3.31)

3.33

item code

IC

identifier for an item, where the identifier is unique within the corresponding *code space* (3.31)

3.34

data identifier

DI

unique code assigned to an *administered item* (3.10) by a *registration authority* (3.23) consisting of a *code space identifier* (3.32) and an *item code* (3.33)

3.35

version identifier

unique code assigned to a version under which an *administered item* (3.10) is submitted or updated by the *registration authority* (3.23)

3.36

class

administered item identification consisting of *administered items* (3.10) that are *classes* (3.13)

Note 1 to entry: This document specifies the value “01” to the *code space identifier* (3.32) for the class category.

3.37

property

<administered item identification> consisting of *administered items* (3.10) that are *properties* (3.14)

Note 1 to entry: This document specifies the value “02” to the *code space identifier* (3.32) for the property category.

3.38

feature

<administered item identification> preconceived form patterns having some (engineering) meaning

Note 1 to entry: This document specifies the value “03” to the *code space identifier* (3.32) for administrative items that are features.

3.39

representation

<administered item identification> consisting of *administered items* (3.10) that are a set of rules for mapping between bit or character sequences in a computer file and members of a conceptual domain (an abstract set of values)

EXAMPLE 1 ISO 22745-2 includes a list of bearing features that includes:

- field width;
- padding (for numbers);
- character to use for decimal separator (for numbers);
- input mask;
- mapping to an external set of codes for members of the conceptual domain.

EXAMPLE 2 ISO/IEC 60559^[22] specifies a representation for the conceptual domain of real numbers.

Note 1 to entry: This document specifies the value “04” to the *code space identifier* (3.32) for the representation category.

3.40

unit of measurement

<administered item identification> consisting of *administered items* (3.10) that are a real scalar quantity, defined and adopted by convention, with which any other quantity of the same kind may be compared to express the ratio of the second quantity to the first one as a number

Note 1 to entry: This document specifies the value “05” to the *code space identifier* (3.32) for the unit of measurement category.

3.41

qualifier of measurement

<administered item identification> consisting of *administered items* (3.10) that are a symbol that provides details of the meaning of a measure

EXAMPLE Qualifiers of measurement include:

- minimum;
- maximum;
- nominal.

Note 1 to entry: This document specifies the value “06” to the *code space identifier* (3.32) for the qualifier of measurement category.

3.42

value of property

<administered item identification> consisting of *administered items* (3.10) that may be assigned as the value portion of a *property value pair* (3.15)

Note 1 to entry: This document specifies the value “07” to the *code space identifier* (3.32) for the value of property category.

3.43

currency

<administered item identification> consisting of *administered items* (3.10) that are a medium of exchange of value, defined by reference to the geographical location of the monetary authorities responsible for it

EXAMPLE ISO 4217 specifies codes for the representation of currencies.

Note 1 to entry: This document specifies the value “08” to the *code space identifier* (3.32) for the currency category.

3.44

datatype

<administered item identification> consisting of *administered items* (3.10) that are a set of distinct values, characterized by *properties* (3.14) of those values, and by operations on those values

EXAMPLE ISO 11404 specifies general purpose datatypes.

Note 1 to entry: This document specifies the value “09” to the *code space identifier* (3.32) for the datatype category.

3.45

document

<administered item identification> consisting of *administered items* (3.10) that are a consistent set of information presented as a unit

Note 1 to entry: This document specifies the value “10” to the *code space identifier* (3.32) for the document category.

3.46**ontology**

<administered item identification> consisting of *administered items* (3.10) that are a set of *classes* (3.13) and *properties* (3.14) that constitute a shared knowledge model of a domain

Note 1 to entry: This document specifies the value “11” to the *code space identifier* (3.32) for the ontology category.

3.47**abbreviation**

<administered item identification> consisting of *administered items* (3.10) that are *abbreviations* (3.6)

Note 1 to entry: This document specifies the value “AB” to the *code space identifier* (3.32) for the abbreviation category.

3.48**concept equivalence relationship**

<administered item identification> consisting of *administered items* (3.10) that are an assertion that two or more *concepts* (3.1) have the same meaning

Note 1 to entry: This document specifies the value “CE” to the *code space identifier* (3.32) for the concept equivalence relationship category.

3.49**concept type**

<administered item identification> consisting of *administered items* (3.10) that are a category of *concepts* (3.1)

Note 1 to entry: This document specifies the value “CT” to the *code space identifier* (3.32) for the concept type category.

3.50**definition**

<administered item identification> consisting of *administered items* (3.10) that are *definitions* (3.4)

Note 1 to entry: This document specifies the value “DF” to the *code space identifier* (3.32) for the definition category.

3.51**file**

<administered item identification> consisting of *administered items* (3.10) that are data stored as a named unit on a data storage medium

Note 1 to entry: This document specifies the value “FL” to the *code space identifier* (3.32) for the file category.

3.52**identification guide**

<administered item identification> consisting of *administered items* (3.10) that are a *data specification* (3.20) that conforms to the syntax specified by ISO/TS 22745-30 and that uses *concept identifiers* (3.2) from an open technical dictionary

EXAMPLE 1 ISO 22745-2 describes that an identification guide is typically maintained by an organization that receives data, e.g., a buyer or group of buyers.

EXAMPLE 2 ISO 22745-2 describes that an identification guide is sometimes referred to as a “template of properties and rules”.

Note 1 to entry: This document specifies the value “IG” to the *code space identifier* (3.32) for the identification guide category.

3.53**<administered item> image**

<administered item identification> consisting of *administered items* (3.10) that are *images* (3.5)

Note 1 to entry: This document specifies the value “IM” to the *code space identifier* (3.32) for the image category.

3.54**language**

<administered item identification> consisting of *administered items* (3.10) that are a system of verbal communication used in a particular country or community

Note 1 to entry: This document specifies the value “LG” to the *code space identifier* (3.32) for the language category.

3.55**organization**

<administered item identification> consisting of *administered items* (3.10) that are a unique framework of authority within which a person or persons act, or are designated to act, towards some purpose

Note 1 to entry: This document specifies the value “OG” to the *code space identifier* (3.32) for the organization category.

3.56**symbol**

<<administered item identification> consisting of *administered items* (3.10) that are a terminological item that is a language-independent graphical pattern that designates a *concept* (3.1)

Note 1 to entry: This document specifies the value “SB” to the *code space identifier* (3.32) for the symbol category.

3.57**term**

<administered item identification> consisting of *administered items* (3.10) that are *terms* (3.7)

Note 1 to entry: This document specifies the value “TM” to the *code space identifier* (3.32) for the term category.

4 Fundamental principles**4.1 Exchange of characteristic data**

The exchange of characteristic data, such as is contained in product catalogues or libraries, is primarily based on the exchange of <concept identifier, value> pairs. The concept identifier uniquely determines the concept that gives meaning to the value.

The full information about the concept is normally not contained within the product catalogue or library; instead, it is defined externally in a concept dictionary or product ontology. This methodology is the baseline for the product data exchange in multiple standards including the ISO 13584 series, the ISO 13399 series, the ISO 15926 series, the ISO 22745 series and the IEC 61360 series, although they provide different data models for modelling dictionaries.

This document provides common resources for these standards and can be used by other standards. This document provides generic formats and functionalities that can be used either

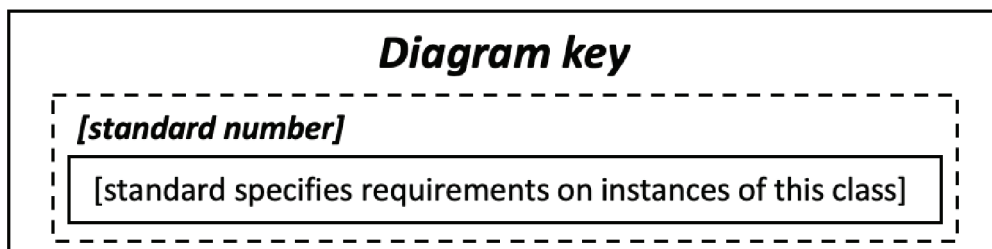
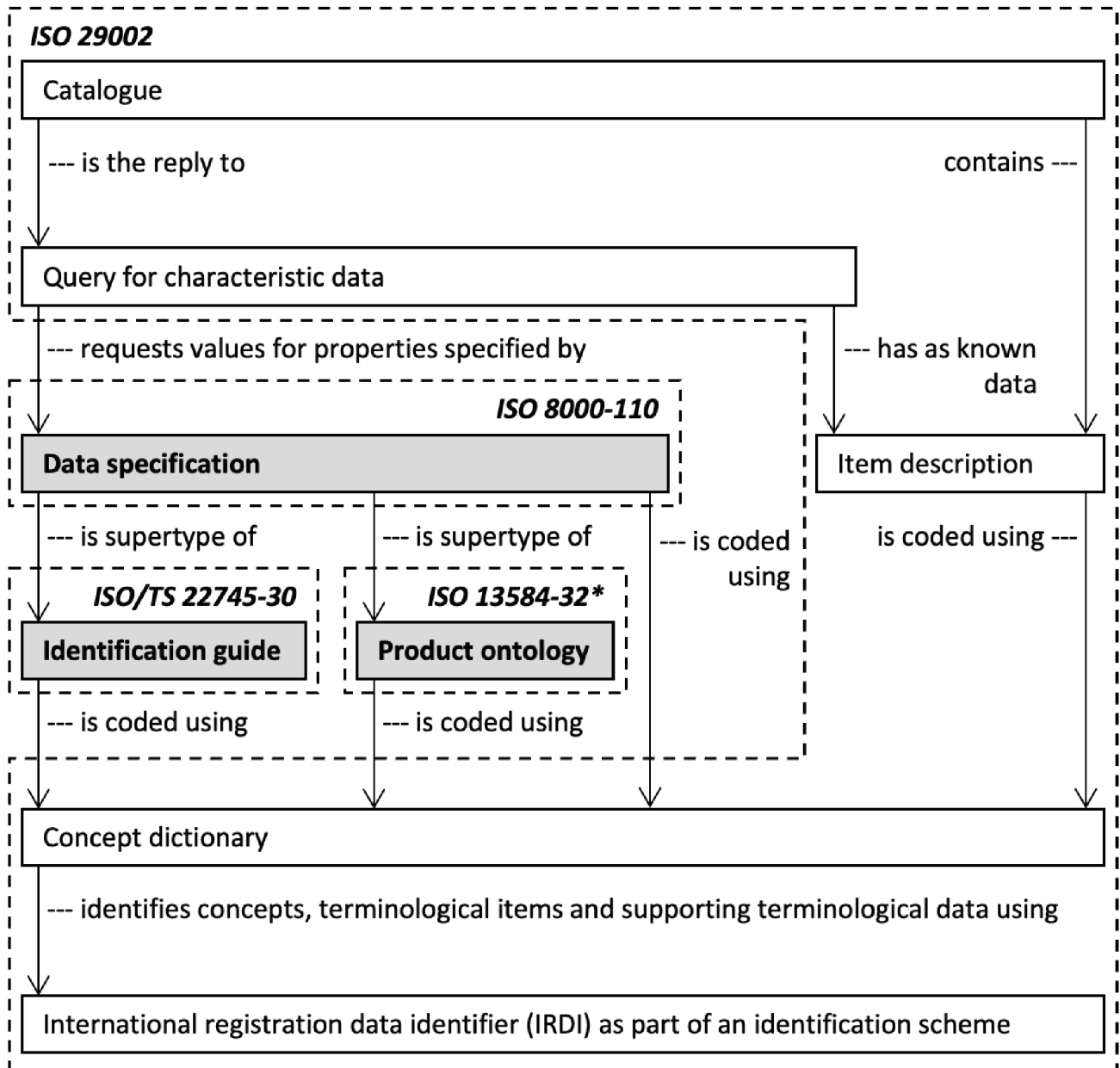
- as-is, that is, without any model-specific restrictions, in combination with standards from the ISO 13584 series and the ISO 22745 series and possibly other standards, or
- according to special adaptations that are defined in the respective standards to tailor the use of the format or functionality to the specific requirements of that standard.

Such adaptations need to be compatible with this document, in the sense that any data file that conforms with the adaptation needs to conform with the corresponding clause of this document, with the exception of UML namespaces.

A high-level planning model that shows the relationships between the major concepts addressed by this document is shown in [Figure 1](#). The concepts with shaded boxes are defined outside of this document. ISO 8000-110 specifies requirements for a data specification but does not specify a representation. Those requirements can be met with an identification guide, specified in ISO/TS 22745-30, or a product ontology specified in the ISO 13584 series parts libraries.

This document contains twelve informative annexes to assist implementation

- [Annex A](#) - Information object registration
- [Annex B](#) - Computer interpretable listings.
- [Annex C](#) - Generation of XML schema from UML model..... 1034
- [Annex D](#) - Relation to the ISO 13584, ISO 22745 and IEC 61360 series... 105
- [Annex E](#) - Usage guidance for source_location
- [Annex F](#) - Referencing metadata from the characteristic data model..... 108 1
- [Annex G](#) - Using the model of characteristic data.
- [Annex H](#) - The role of property value pair.
- [Annex I](#) - Usage guide for get concept model....
- [Annex I](#) - XSD and JSON parameter names
- [Annex K](#) - The role of data dictionary models in achieving semantic interoperability.
- [Annex L](#) - Cross tables of clauses and figures from withdrawn documents:



NOTE 1 See ISO/IEC 19505-1 for details on the notation in this diagram.

NOTE 2 The asterisk in this figure indicates that other parts of the ISO 13584 series, the ISO 61380 series and the IEC 62656 series would all be examples of a product ontology in this figure.

Figure 1 — High-level planning model

This document specifies:

- a conceptual information model for basic entities and types in Unified Modeling Language (UML);
- an exchange file format for basic entities and types based on Extensible Markup Language (XML);
- a format for identifiers for elements of a concept dictionary;
- a conceptual information model and an exchange file format for terminology information from a concept dictionary;
- a conceptual information model and an exchange file format for characteristic data;
- an interface to retrieve information from a concept dictionary;
- a conceptual information model and an exchange file format for requesting product and service characteristic and supplier identification from item and information suppliers.

In addition, this document specifies three sets of capabilities in the form of services:

- a location service (see [9.3.1](#)) that, given a registration authority identifier, returns location on the internet of terminology and ontology services for the registration authority;
- a terminology service (see [9.3.2](#)) that searches for concepts, languages and other elements of the dictionary based on a rich set of keywords, search criteria and expressions; given an international registration data identifier (IRDI) conforming to [Clause 5](#) to retrieve terminological information;
- an ontology service (see [9.3.3](#)) that retrieves ontological information about a concept based on the IRDI of the concept.

This document also defines types and entities for representing the following:

- language codes as specified by the ISO 639 series;
- country codes as specified by the ISO 3166 series;
- currency codes as specified by ISO 4217;
- ASN.1 identifiers as specified by the ISO/IEC 8824 series^[5];
- dates and times as specified by ISO 8601^[4];
- uniform resource identifiers (URI) as specified by RFC 8820^[35];
- international text, which is human-readable text, given in one or more languages.

The terminology service returns data structures that describe the content of a concept dictionary, and these structures are specified by this document. Other data structures required to support the three services are also defined. The data model and exchange format for the ontological information returned by the ontology service are not specified.

NOTE IEC 62656-1 may be used for this purpose, as can any format conforming to this document.

In this document, the term “SQL Multimedia and Application Packages” (SQL/MM) refers to the full-text query syntax specified by ISO/IEC 13249-2. The terms Backus-Naur Form (BNF) and Extended BNF (EBNF) refer to the syntactic metalanguage specified by ISO/IEC 14977.

See RFC 8820^[35] for the uniform resource identifier (URI) syntax specification.

The query data model (see [10.1](#)) uses the item entity to convey known property values. A query may reference a data specification, which specifies the properties for the class of items being queried. The format of the data specification is not specified by this document. ISO 13584-32 and ISO/TS 22745-30 both specify data models and exchange formats that may be used for data specifications.

In general, the reply to a query will be a characteristic data file.

Figure 2 shows major data flows supported by this document.

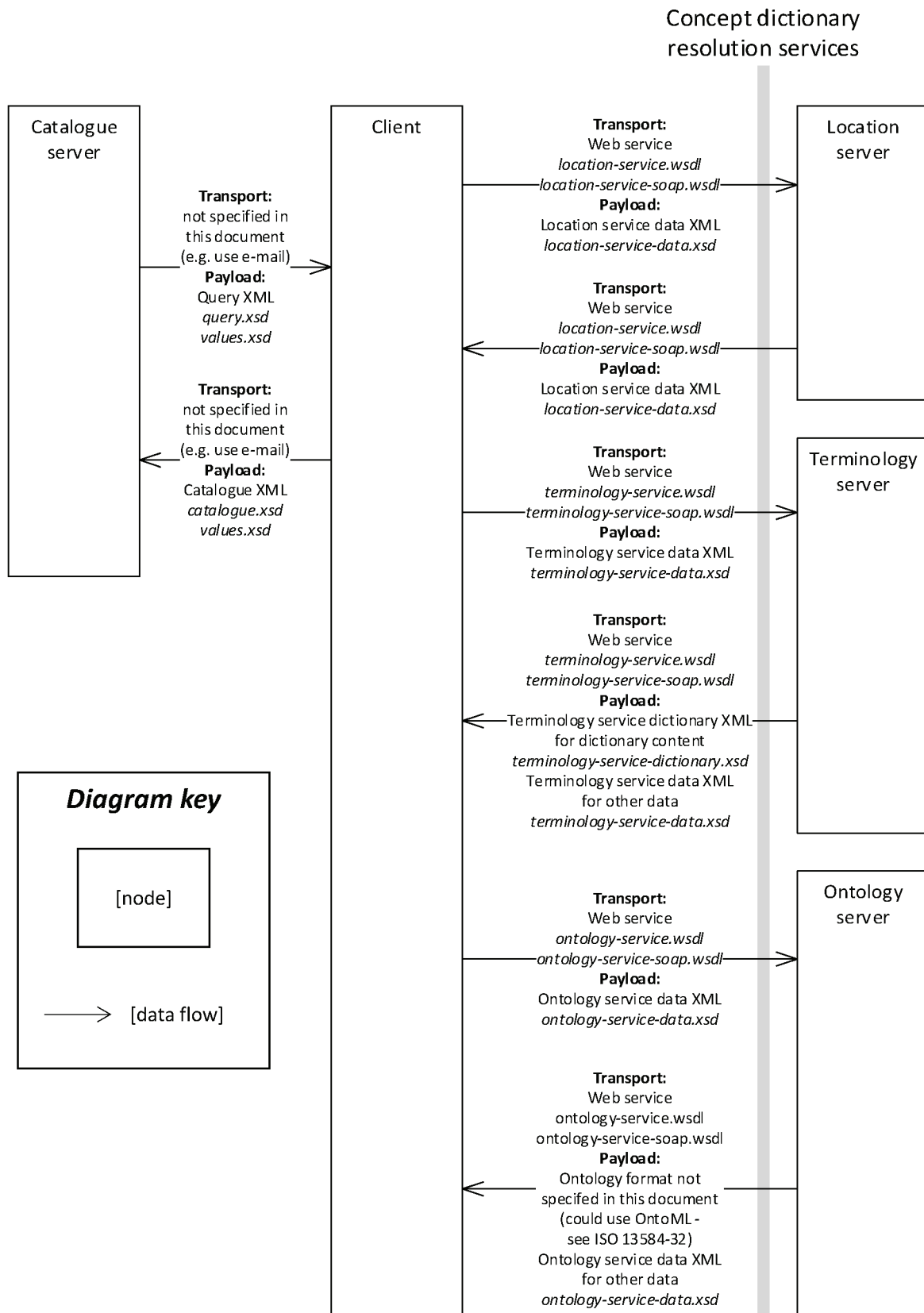


Figure 2 — Major data flows

This document specifies eleven XML data schemas (see [Figure 3](#)): basic entities and types; catalogue; identifier; location service data; ontology service data; query; resolution service data; terminology service data; terminology service dictionary; and value.

This document specifies three WSDL interface schemas (see [Figure 3](#)): location service, terminology service, and ontology service. Each interface schema has a SOAP binding WSDL and a HTTP binding OAS schema (in JSON format), for an additional six schema documents.

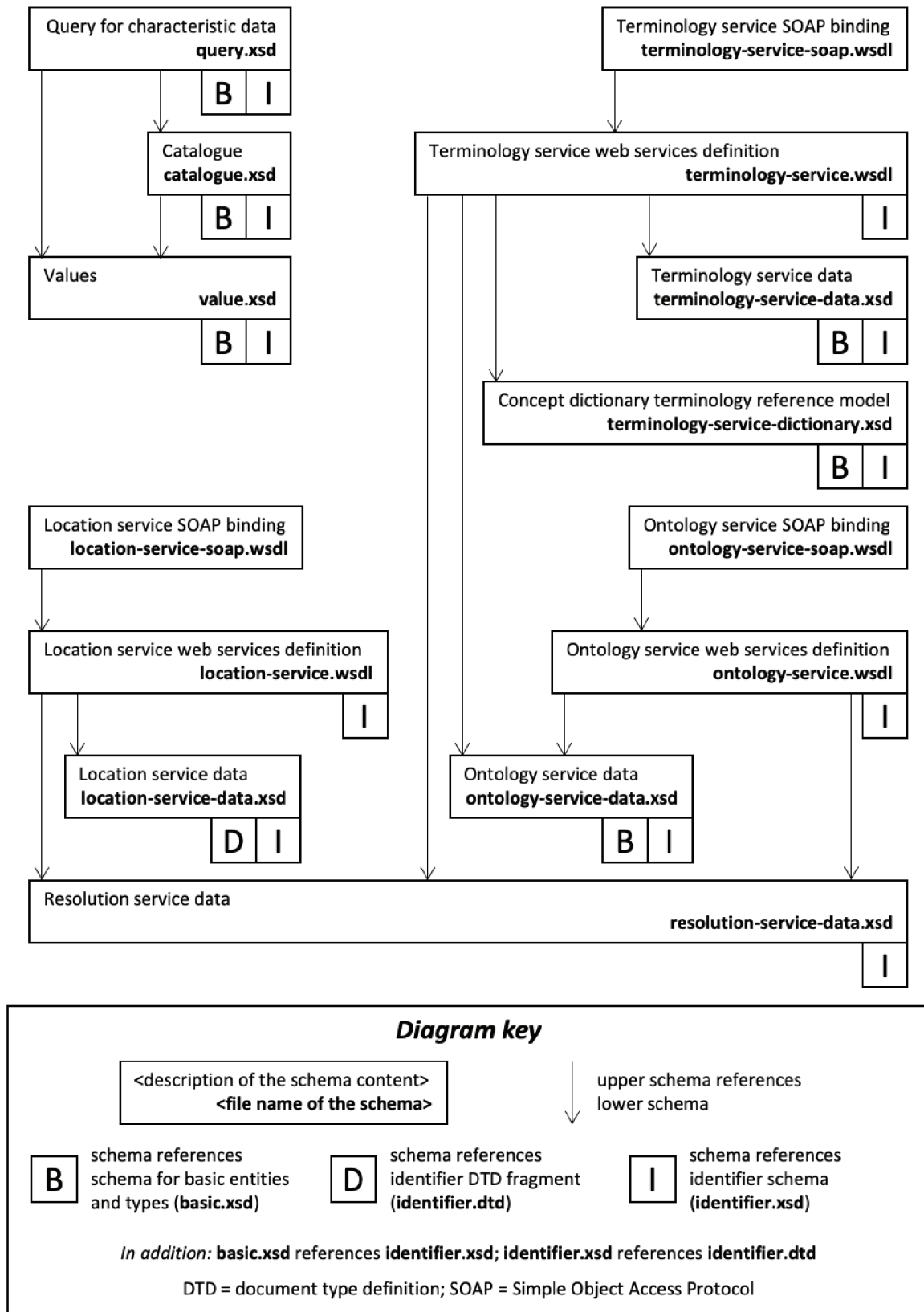


Figure 3 — Schema dependencies diagram

5 Basic datatypes to support exchange of characteristic data

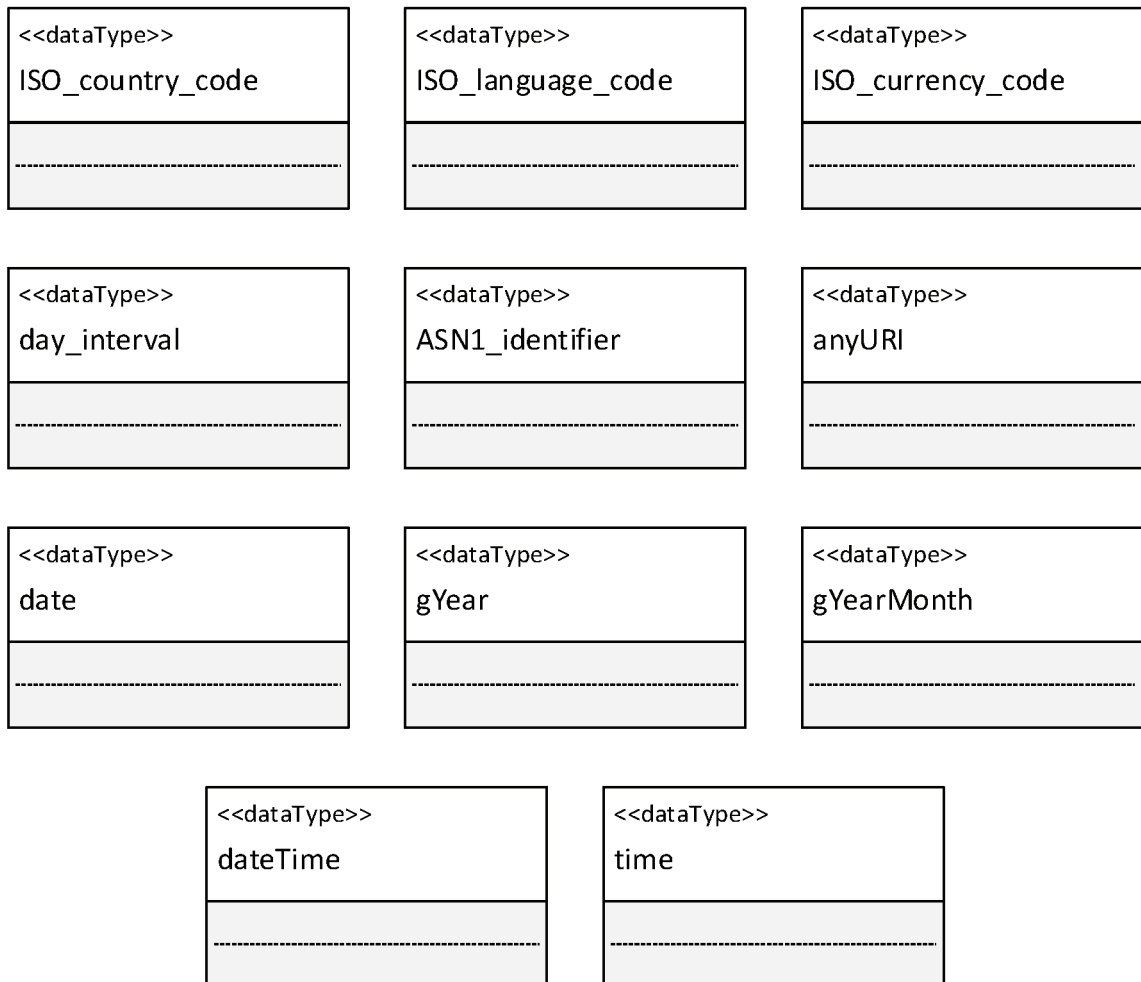
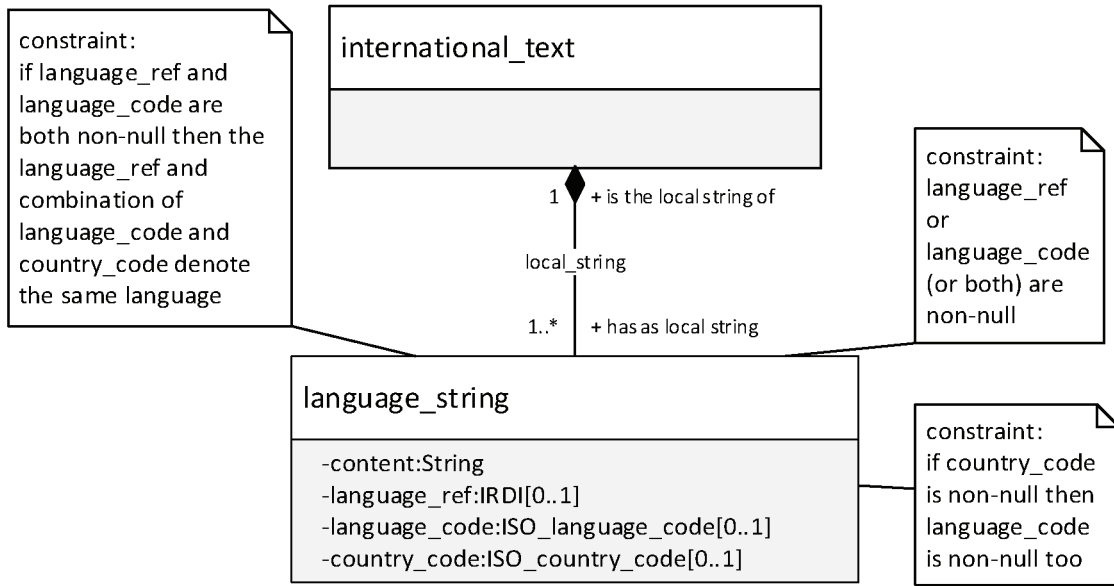
5.1 Overview of datatypes to support exchange of characteristic data

To support the other capabilities specified by this document, this clause specifies:

- a conceptual information model for basic entities and types (see [Figure 4](#)), using Unified Modeling Language (see ISO/IEC 19505-1);
- an exchange file format for terminology information in a concept dictionary (see [10.2](#)), using Extensible Markup Language (XML)^[31] or JavaScript Object Notation (JSON)^[32].

NOTE 1 This clause is not intended to define an exchange format by itself. Rather, it is intended that entities and types defined in this clause are imported into other models and exchange format definitions.

NOTE 2 The basic entities and types illustrated in [Figure 4](#) may not be applicable to all repositories and ontologies using these exchange file formats.



NOTE See ISO/IEC 19505-1 for details on the notation in this diagram.

Figure 4 — UML class diagram of the basic data model

5.2 Exchange file format for basic datatypes

5.2.1 Overview of the format for basic datatypes

The model of the exchange file format consists of the following types:

- ISO_language_code (see [5.2.2.1](#));
- ISO_country_code (see [5.2.2.2](#));
- ISO_currency_code (see [5.2.2.3](#));
- ASN1_identifier (see [5.2.2.4](#));
- anyURI (see [5.2.2.5](#));
- day_interval (see [5.2.2.6](#));
- date (see [5.2.2.7](#));
- gYear (see [5.2.2.8](#));
- gYearMonth (see [5.2.2.9](#));
- dateTime (see [5.2.2.10](#));
- time (see [5.2.2.11](#));
- international_text (see [5.2.2.12](#));
- language_string (see [5.2.2.13](#)).

5.2.2 Specified datatypes for exchange of characteristic data

5.2.2.1 ISO_language_code type

The ISO_language_code type is an alpha-2 or alpha-3 language code, as specified by the ISO 639 series.

The ISO_language_code type has the no attributes, no assertions and no constraints.

5.2.2.2 ISO_country_code type

The ISO_country_code type is either an alpha-2 country code or a country subdivision code. These codes are specified by the ISO 3166 series.

The ISO_country_code type has the no attributes, no assertions and no constraints.

5.2.2.3 ISO_currency_code type

The ISO_currency_code type is an alpha-3 currency code, as specified by ISO 4217.

The ISO_currency_code type has the no attributes, no assertions and no constraints.

5.2.2.4 ASN1_identifier type

The ASN1_identifier type is an identifier assigned in accordance with ISO/IEC 8824.

The ASN1_identifier type has the no attributes, no assertions and no constraints.

5.2.2.5 anyURI type

The anyURI type is a uniform resource identifier, represented according to the specification for datatypes in XML schema definitions[37].

NOTE The generic syntax of a URI is specified by RFC 8820[35].

The anyURI type has the no attributes, no assertions and no constraints.

5.2.2.6 day_interval type

The day_interval type is a year, a month of a year or a date.

NOTE This type is called “day interval” because a year is the interval from the first day of the year to the last day of the year; a month is the interval from the first day of the month to the last day of the month; and a date is an interval consisting of a single day.

The day_interval type has the no attributes, no assertions and no constraints.

5.2.2.7 date type

The date type is an interval of exactly one day in length beginning at midnight. This datatype is equivalent to the date datatype specified by the XML Schema specification[37].

The date type has the no attributes, no assertions and no constraints.

5.2.2.8 gYear type

The gYear type is a year according to the Gregorian calendar. This datatype is equivalent to the gYear datatype specified by the XML Schema specification[37].

The gYear type has the no attributes, no assertions and no constraints.

5.2.2.9 gYearMonth type

The gYearMonth type is a month according to the Gregorian calendar. This datatype is equivalent to the gYearMonth datatype specified by the XML Schema specification[37].

The gYearMonth type has the no attributes, no assertions and no constraints.

5.2.2.10 dateTime type

The dateTime type is a specific time on a specific day. This datatype is equivalent to the dateTime datatype specified by the XML Schema specification[37].

The dateTime type has the no attributes, no assertions and no constraints.

5.2.2.11 time type

The time type is an instant of time that occurs each day. This datatype is equivalent to the time datatype specified by the XML Schema specification[37].

The time type has the no attributes, no assertions and no constraints.

5.2.2.12 international_text type

The international_text type is a collection of human-readable text, given in one or more languages.

EXAMPLE The following set of string and language pairs: { ["The world is flat.", English], ["La terre est plate.", French], ["El mundo es plano.", Spanish] }.

The `international_text` type has the following attribute:

- `local_string`, which represents the rendering of the `international_text` in a specific language.
- The `international_text` type is subject to the following assertion:
- the `international_text` has as local string one or more `language_string` instances, each of which is the `local_string` of exactly one `international_text` instance.

5.2.2.13 `language_string` type

The `language_string` type is a human-readable text in a specific language.

The `language_string` type has the following attributes:

- `content`, which is the sequence of characters that represents the human-readable text;
- `country_code`, which is the alpha-2 country codes specified by the ISO 3166 series and represents the language in which the content is written;
- `language_code`, which is the alpha-2 or alpha-3 language code specified by the ISO 639 series and represents the language in which the content is written;
- `language_ref`, which is the IRDI for the language in which the content is written.

The `language_string` type is subject to the following assertion:

- the `language_string` is the `local_string` of exactly one `international_text` instance, which has as local string one or more `language_string` instances.
- The `language_string` type is subject to the following constraints:
- if `language_ref` and `language_code` are both non-null, then the `language_ref` and the combination of `language_code` and `country_code` shall denote the same language;
- if `country_code` is non-null, then `language_code` shall also be non-null;
- `language_ref` or `language_code` (or both) shall be non-null.

6 Identification scheme

6.1 Purpose of the scheme

This clause specifies a scheme for identifying the administered items (see [6.3](#)) that appear in concept dictionaries. These administered items are:

- concepts (i.e., using a concept identifier);
- concept information elements, including organizations.

The purpose of the scheme is to enable interoperability between implementations of standards such as the ISO 13584 series and the ISO 22745 series in addition to more general applicability.

EXAMPLE 1 Provisions in this document are specialized by ISO/TS 22745-13.

EXAMPLE 2 Provisions in this document are specialized by ISO 13584-32.

6.2 Use of the scheme

6.2.1 General considerations

The scheme specifies provisions for international registration data identifiers (IRDI) and the following identifiers that are top-level elements of an IRDI:

- registration authority identifiers (see [6.5](#));
- data identifiers (see [6.6](#));
- version identifiers (see [6.7](#)).

An IRDI identifies an administered item (see [6.3](#)). Data identifiers are assigned by a registration authority to achieve unique identification within the domain of the registration authority.

NOTE 1 The term registration authority is used in the sense “organization responsible for maintaining a register” as described by ISO/IEC 11179-1. A registration authority as defined in ISO/IEC 11179-1 can be an ISO registration authority, an ISO maintenance agency or an organization that is responsible for managing a concept dictionary.

NOTE 2 A concept dictionary is considered to be a kind of register.

As each registration authority can determine its own data identifier assignment scheme, there is no guarantee that the data identifier by itself will uniquely identify an administered item. For example, if two registration authorities both use sequential 6-digit numbers, there can be two administered items with the same data identifiers. These administered items will, however, almost certainly not be the same. Both the data identifier and the registration authority identifier are necessary for identification of an administered item.

If particular attributes of an administered item change, then a new version of the administered item is created and registered. The registration authority determines these attributes. In such a case, a version identifier completes the unique identification of an administered item.

NOTE 3 For further guidance, see ISO/IEC 11179-6.

An IRDI can serve as a key when exchanging data among information systems, organizations or other parties who wish to share a specific administered item but who are not able to use the same names or contexts.

NOTE 4 This document specifies a coding for registration authority identifiers and data identifiers, where the primary purpose of the coding is to provide a reliable way to generate unambiguous IRDI strings. The purpose is not to encode any semantics. As a result, applications can, in general, only treat registration authority identifiers and data identifiers as opaque strings. Such applications cannot guarantee consistent interpretation from breaking registration authority identifiers and data identifiers into their constituent elements. For example, if a data identifier is “TM-094847”, then an application will ensure reliable interpretation of this as the identifier for a term by calling a service that conforms to [Clause 9](#) of this document. This call is more reliable than deducing this is the identifier for a term from using the fact the string starts with “TM-”.

6.2.2 Using the scheme as a resource for other standards

This clause is intended as a common resource that will be used by several standards.

Each standard that uses this clause may adapt the scheme to meet the needs of that standard by restricting the syntax and adding semantics to elements within the existing syntax.

EXAMPLE 1 ISO/TS 22745-13 restricts the identifier format and related XML schemas in this document for use by the ISO 22745 series.

EXAMPLE 2 ISO 13584-32 restricts the identifier format and related XML schemas in this document for use by the ISO 13584 series.

Such adaptations will be compatible with this document in the sense that any data file that conforms to the adaptation will conform with this document, with the possible exception of UML namespaces. Any exchange

file that uses a restriction of a schema specified by this document shall contain a reference to the namespaces specified by this document. That file may also contain additional namespace references.

NOTE The file may contain a reference to the namespace corresponding to a restricted version of the schema.

6.3 Administered items

To promote interoperability between standards that specify how to represent characteristic data this document specifies a taxonomy of administered items (see [Figure 5](#)).

EXAMPLE The ISO 13584 series and the ISO 22745 series specify how to represent characteristic data.

NOTE 1 Neither the ISO 13584 series the IEC 61360 series, nor the ISO 22745 series uses all the items in this taxonomy, but each class of administered item in these two series maps onto one of the items in this taxonomy.

From a wider perspective, the distinction between concepts and concept information elements is subjective. The distinction in this document provides the practical basis for concept dictionaries to contain descriptions of any kind of concept, including classes and properties of real-world objects, algorithms, mathematical operators and modelling paradigms.

When a standard reuses the resources in this document, the standard can map from a set of recognized items onto the items in the taxonomy. This mapping does not require the information models of those standards to include the hierarchical breakdown specified by [Figure 5](#).

Any standard using the resources in this document can map the administered items they define onto the items in this taxonomy. This mapping does not require the information models of those standards to acknowledge the hierarchical breakdown specified by [Figure 5](#).

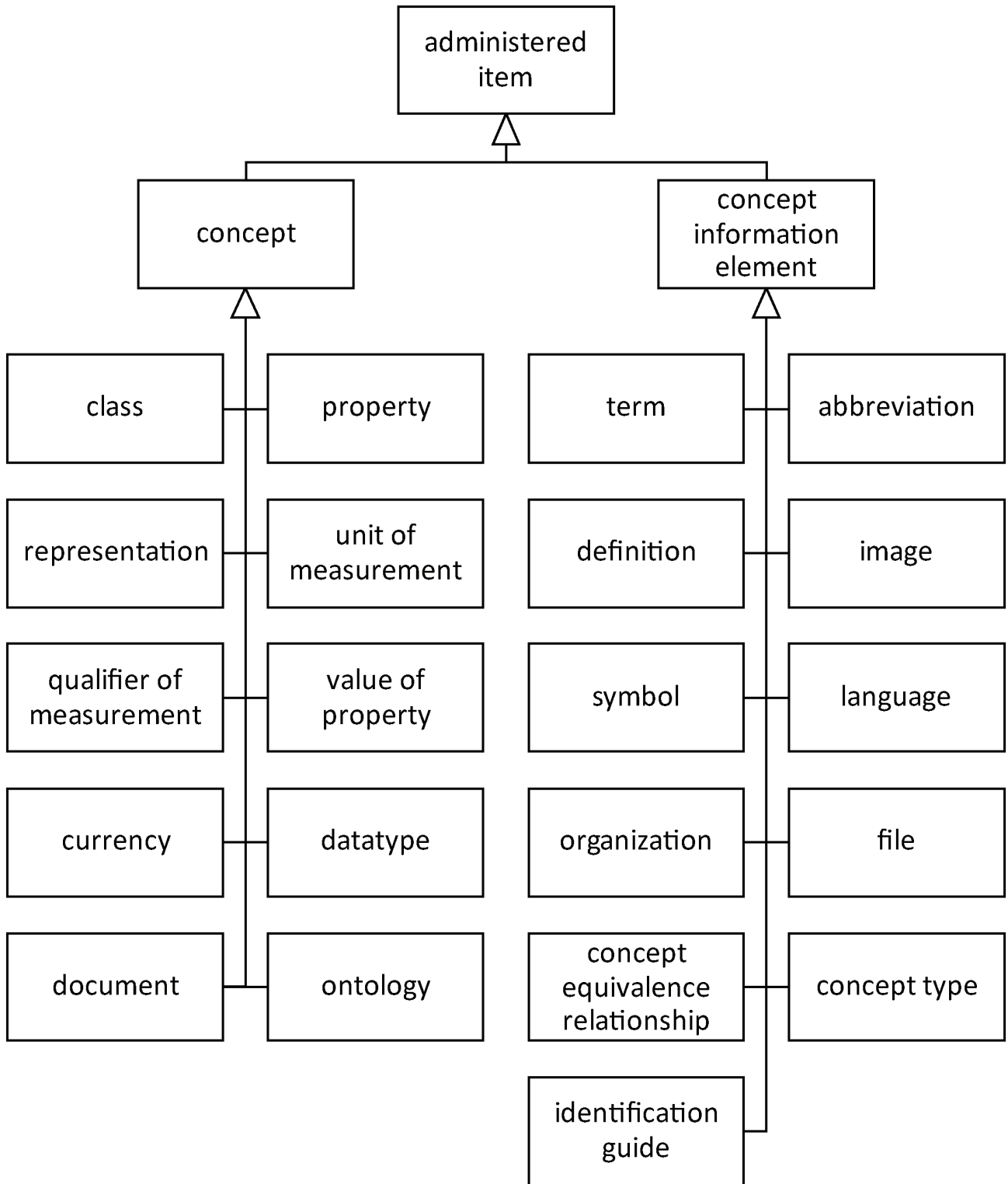


Figure 5 — Taxonomy of administered items

NOTE 2 See [Annex D](#) for the relationship between the administered items in [Figure 5](#) and those administered items recognized by in the ISO 13584, ISO 22745 and IEC 61360 series.

6.4 Key characteristics of identifiers for administered items

6.4.1 Identification of administered items

A concept dictionary shall identify:

- an organization using a registration authority identifier (see [6.5](#)), when the organization has been registered under an ISO/IEC 6523 organization identification scheme;

EXAMPLE ISO is registered as organization “1” under the ISO/IEC 6523 organization identification scheme having the International Code Designator “0112”. As a result, a concept dictionary identifies ISO using the registration authority identifier “0112-1”.

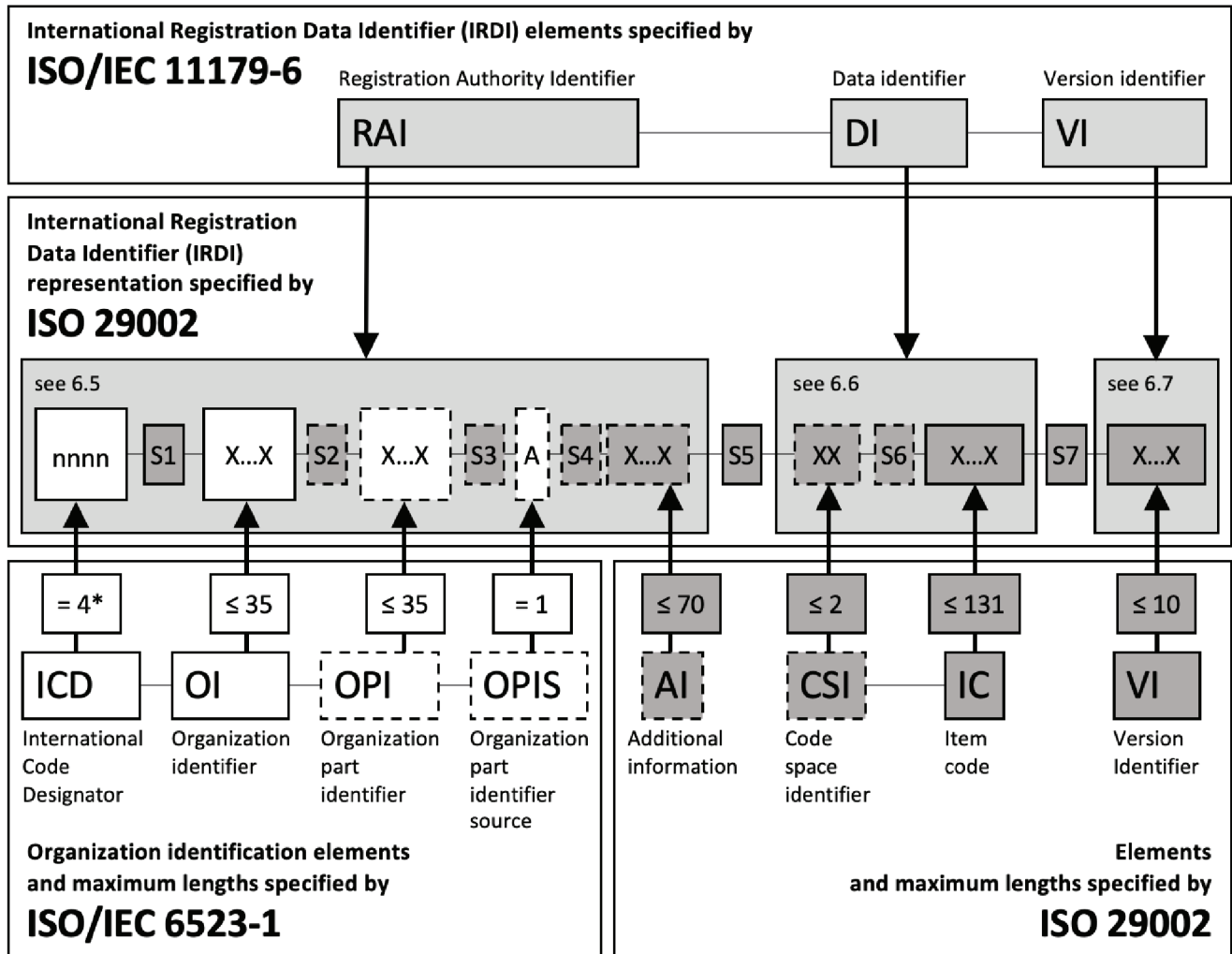
- an administered item using an IRDI (see [6.4](#)).

NOTE An organization may be registered under both an ISO/IEC 6523 organization identification scheme and a concept dictionary. In this case, either a registration authority identifier or an IRDI are used to identify an organization.

6.4.2 Overall structure of the IRDI

An IRDI identifies an administered item and consists of the following (see [Figure 6](#)):

- a registration authority identifier (see [6.5](#));
- a data identifier (see [6.6](#));
- a version identifier (see [6.7](#)).



Key



optional element

n digit

X safe character (see 6.4.3)

A uppercase alphanumeric (see 6.4.3)

Sn valid separator (see 6.5.2)

* ISO/IEC 6523-1 specifies the ICD may be transmitted in a variable length, but ISO 29002 constrains this to a fixed length of four

Figure 6 — Identifier format

6.4.3 Character set for the IRDI

In this document, the term “uppercase alphanumeric” refers to an uppercase letter or a digit.

In this document, the term “safe character” refers to an uppercase letter, a digit, a colon, a full stop or a low line.

An IRDI shall only contain the characters listed in [Table 1](#)

Table 1 — Valid character set for the IRDI

Designation	ISO/IEC 10646 code (hexadecimal)	Description
colon	003A	“:”
digits	0030 – 0039	“0” to “9”
full stop	002E	“.”
hyphen-minus	002D	“_”
low line	005F	“ ”
number sign	0023	“#”
solidus	002F	“/”
lowercase letters	0061 – 007A	“a” to “z”
uppercase letters	0041 – 005A	“A” to “Z”

6.4.4 Length of the IRDI

The maximum length of an IRDI shall be 290 characters.

6.4.5 Representation of the IRDI

The IRDI shall be represented by a combination of the registration authority identifier, followed by a separator (S5 in [Figure 6](#)), followed by the data identifier, followed by a separator (S7 in [Figure 6](#)) and completed with the version identifier. The separator S5 shall be a number sign character (“#”, the ISO/IEC 10646 code “0023”). The separator S7 shall be either a number sign character (“#”) or two number sign characters (“##”).

6.5 Registration authority identifier

6.5.1 Elements of registration authority identifiers

A registration authority identifier shall conform to the applicable provisions specified by the ISO/IEC 6523 series.

A registration authority identifier shall consist of the elements shown in [Table 2](#).

Table 2 — Elements of registration authority identifier

Element name	Valid characters (see 6.4.3)	Mandatory or optional	Maximum length	Values
International Code Designator	positive integer	mandatory	4	Assigned by the ISO/IEC 6523 registration authority in accordance with ISO/IEC 6523-2. Note ISO/IEC 6523-1:2023, 4.2.a states “The ICD values shall be integers from 1 to 9999. The ICD may be transmitted as a variable-length data element; conversely, if transmitted in a 4 digit fixed length field, leading zeros shall be added to complete the format to 4 digits if the ICD value is less than 1000.”
organization identifier	string of safe character	mandatory	35	Assigned by the issuing organization in accordance with ISO/IEC 6523-1.
organization part identifier	string of safe character	optional	35	Assigned by the issuing organization in accordance with ISO/IEC 6523-1.
organization part identifier source	string of uppercase alphanumeric	optional	1	Assigned by the issuing organization in accordance with ISO/IEC 6523-1.
additional information	string of safe character	optional	70	Assigned by the issuing organization.

A scheme is registered under ISO/IEC 6523 with an International Code Designator (ICD) .

The issuing organization acts as the registration authority (in this case, the organization responsible for a concept dictionary) for a particular dictionary.

In its role as the issuing organization managing the scheme, the issuing organization assigns an Organization Identifier.

To distinguish various parts library dictionaries produced by the same organization, the additional information may contain the standard number assigned by issuing organization to this dictionary.

EXAMPLE 1 Within the dictionary published as IEC 61360-4 DB edition 1, the registration authority identifier consists of the value "0112" for ICD, the value "2" for organization identifier, and the additional information is IEC 61360-4 DB edition 1.

EXAMPLE 2 [Table 3](#) lists examples of current schemes and their organization identifiers.

Table 3 — Examples of International Code Designator schemes

International Code Designator	Name of scheme	Name of issuing organization	Organization identifier
0121	ISO register for Standards producing Organizations	International Organization for Standardization (ISO)	1
0121	ISO register for Standards producing Organizations	International Electrotechnical Commission (IEC)	2
0121	ISO register for Standards producing Organizations	International Organization for Standardization & International Electrotechnical Commission (ISO/IEC)	3
0161	ECCMA Open Technical Dictionary	Electronic Commerce Code Management Association (ECCMA)	1
0194	KOIOS Open Technical Dictionary	KOIOS Master Data Limited	1
0207	PiLog Ontology Codification Identifier (POCI)	PiLog Group	1

NOTE 1 The organization part identifier, the organization part identifier source and the additional information elements are optional.

NOTE 2 It is not necessary for a registration authority to be an issuing organization for an ISO/IEC 6523 organization identification scheme. The registration authority may be assigned an organization identifier under any ISO/IEC 6523 organization identification scheme.

NOTE 3 Any organization identifier assigned to an organization within any scheme registered under ISO/IEC 6523 can be used as a valid registration authority identifier for the concepts defined in a concept dictionary of which this organization is the registration authority.

NOTE 4 The registration authority identifier works with any organization regardless of its status as an ISO registration authority, maintenance agency or neither. The only applicable requirement is the organization is registered under an ISO/IEC 6523 organization identification scheme.

6.5.2 representation of registration authority identifiers

The registration authority identifier shall be represented by a combination of the elements International Code Designator, organization identifier, organization part identifier, organization part identifier source and additional information in that sequence and using the separators specified by [Table 4](#). Each separator shall be exactly one character in length.

In a registration authority identifier, the International Code Designator shall be represented by exactly four digits and if the value is less than 1000, then the representation shall include the necessary leading "0" digits to achieve the required length of four digits.

Table 4 — Valid separators when representing the registration authority identifier

Separator	Preceding element	Valid character	Character name	ISO/IEC 10646 code	Requirement
S1	International Code Designator	"_"	hyphen-minus	002D	Always required
		"."	full stop	002E	
		"/"	solidus	002F	
S2	organization identifier	"_"	hyphen-minus	002D	Required if any of organization part identifier, organization part identifier source or additional information are not null
		":"	colon	003A	
		"/"	solidus	002F	
S3	organization part identifier	"_"	hyphen-minus	002D	Required if either of organization part identifier source or additional information are not null
		"/"	solidus	002F	
S4	organization part identifier source	"_"	hyphen-minus	002D	Required if additional information is not null
		"/"	solidus	002F	

NOTE 1 By using a full stop character for separator S1 and a colon character for separator S2, an organization can create identifiers that conform to the syntax requirements specified by ISO 8000-115 to identify the organization issuing an identifier.

NOTE 2 These provisions are compatible with but are more restrictive than those in ISO/IEC 6523.

NOTE 3 The logical resource specified by IEC 62656-1 and ISO 13584-35 can use both the information supplier code defined in ISO 13584-26 and the RAI defined in this document

EXAMPLE 1 The string "0123-45-678-9-abc" conforms to the provisions that this document specifies for a registration authority identifier. In this identifier, the (mandatory) International Code Designator is "0123", the (mandatory) organization identifier is "45", the (optional) organization part identifier is "678", the (optional) organization part identifier source is "9" and the (optional) additional information is "abc".

EXAMPLE 2 The string "0123-45" conforms to the provisions that this document specifies for a registration authority identifier. In this identifier, the (mandatory) International Code Designator is "0123", the (mandatory) organization identifier is "45", the (optional) organization part identifier is "null", the (optional) organization part identifier source is "null" and the (optional) additional information is "null".

EXAMPLE 3 The string "0123/45///61360_4" conforms to the provisions that this document specifies for a registration authority identifier. In this identifier, the (mandatory) International Code Designator is "0123", the (mandatory) organization identifier is "45", the (optional) organization part identifier is "null", the (optional) organization part identifier source is "null" and the (optional) additional information is "61360_4".

6.6 Data identifier

6.6.1 Elements of data identifiers

A data identifier shall consist of the elements shown in [Table 5](#).

Table 5 — Elements of data identifier

Element name	Valid characters (see 6.4.3)	Maximum length	Values
code space identifier (CSI)	string of uppercase alphanumeric	2	See Table 4 and Table 5 .
item code	string of safe character	131	Unique within the code space.

The guidance in [Table 6](#) is included to demonstrate how the administered items may be used as a code space identifier.

Table 6 — Code space identifiers for administered items that are concepts (values “01” to “11”)

CSI	Administered item	Guidance
01	class	This is a set of objects that share the same properties.
02	property	This is a defined parameter suitable for the description and differentiation of objects (see Clause 8 for the data model). A property can be combined with a value to describe a characteristic of an object. This combination is called a “property value pair”. For example, a table is 2 m wide, has colour red and has a top made of plastic. The characteristic “2 m wide” can be described by the property “width” combined with the value “2” and the unit of measurement “metre”. The characteristic “coloured red” can be described by the property “colour” combined with the value “red”. The characteristic “top made of plastic” can be described by the property “top material” combined with the value “plastic”.
03	feature	This is a preconceived form pattern that has some (engineering) meaning.
04	representation	This is a set of rules for mapping between bit or character sequences in a computer file and members of a conceptual domain (an abstract set of values). For example, all of the following can be specified in a representation: — field width; — padding (for numbers); — character to use for decimal separator (for numbers); — input mask; — mapping to an external set of codes for members of the conceptual domain. IEC 60559 specifies a representation for the conceptual domain of real numbers.
05	unit of measurement	See the ISO 80000 series and the IEC 80000 series.
06	qualifier of measure	This is a symbol that provides details of the meaning of a measure. The terms “minimum”, “maximum” and “nominal” are qualifiers of measure. EXAMPLE: “nominal” is used as a qualifier of measure of a stated value of property in many domains, including pressure, (see ISO 7268) and for pipe size (see API 6d)
07	value of property	This is a concept, defined in a concept dictionary, that can be assigned as the value portion of a property value pair.
08	currency	See ISO 4217.
09	datatype	See ISO/IEC 11404.
10	document	This is a consistent set of information presented as a unit.
11	ontology	This is a set of classes and properties that constitute a shared knowledge model of a domain.

The code space identifier may be null when the administered items are exchanged using logical resource as specified by ISO 13584-26.

NOTE 1 The CSI is particularly important for the robustness of exchange of the administered items using serialisation of concepts such as the XML format as specified by ISO 13584-32.

NOTE 2 The logical resource specified by ISO 13584-26 is specified by IEC 62656-1 for exchanging administered items with spreadsheets organised by kind of item, consequently helping to highlight when the IRDI for an item includes the wrong code space identifier.

When not null, the code space identifier shall consist of exactly two alphanumeric characters.

NOTE 3 Each concept (see [Table 6](#)) has been assigned a code space identifier that is a string of digits. For all other administered items, a code space identifier consisting of uppercase letters has been assigned.

The guidance in [Table 7](#) is included to demonstrate how the administered items may be used as a code space identifier. The formal definition for the following terms when used in the context of administered items is included in [clause 3](#):

- abbreviation ([3.47](#));
- concept equivalence relationship ([3.48](#));
- concept type ([3.49](#));
- [definition \(3.50\)](#);
- file ([3.51](#));
- identification guide ([3.52](#));
- image ([3.53](#));
- language ([3.54](#));
- organization ([3.55](#));
- symbol ([3.56](#));
- term ([3.57](#))

Table 7 — Code space identifiers for administered items (values “AB” to “TM”)

CSI	Administered item	Guidance
AB	abbreviation	See ISO 704.
CE	concept equivalence relationship	This is a relationship between two concepts that asserts that they have the same meaning.
CT	concept type	This is a category of concepts.
DF	definition	See ISO 704. Any notes, remarks or examples are part of a definition. See Clause 7 for the data model.
FL	file	This is a data stored as a named unit on a data storage medium.
IG	identification guide	See ISO/TS 22745-30.
IM	image	This is a representation of a concept that is primarily graphic.
LG	language	This is a system of verbal communication used in a particular country or community.
OG	organization	This is a unique framework of authority within which a person or persons act, or are designated to act, towards some purpose.
SB	symbol	This is a terminological item that is a language-independent graphical pattern that designates a concept.
TM	term	See ISO 704. Terms are considered synonymous if they are associated with the same concept. See Clause 7 for the data model.

NOTE 4 The list of code space identifiers in [Table 6](#) and [Table 7](#) does not cover all possible types of administered items. The item code is assigned by the registration authority of the concept dictionary. The item code shall not be null.

6.6.2 Representation of data identifiers

The data identifier shall be represented by combining the code space identifier, followed by a separator (S6 in [Figure 6](#)) and completed with the item code.

If the code space identifier is null, then the separator shall be null.

Table 8 — Valid separators when representing the data identifier and the version identifier

Separator	Preceding element	Valid character	Character name	ISO/IEC 10646 code	Requirement
S5	Registration authority identifier	"-"	hyphen-minus	002D	Always required
		"#"	Number sign	0023	
		"/"	solidus	002F	
S6	Code space identifier	"-"	hyphen-minus	002D	Required if code space identifier is not null
		"/"	solidus	002F	
S7	Item code	"-"	hyphen-minus	002D	Required if the version identifier is not null
		"#"	Number sign	0023	
		"/"	solidus	002F	

If the code space identifier is not null, then the separator shall be either a hyphen-minus character ("-", the ISO/IEC 10646 code "002D") or a solidus character ("/", the ISO/IEC 10646 code "002F").

EXAMPLE 1 A particular dictionary conforms to the ISO 22745 series and identifies the concept of "VALVE, BALL" as "0207-1#01-089711#1" and the term "VALVE, BALL" with the identifier "0207-1#TM-089711#1".

6.7 Version identifier

The version identifier shall:

- be a positive integer;

NOTE The null value is not a positive integer.

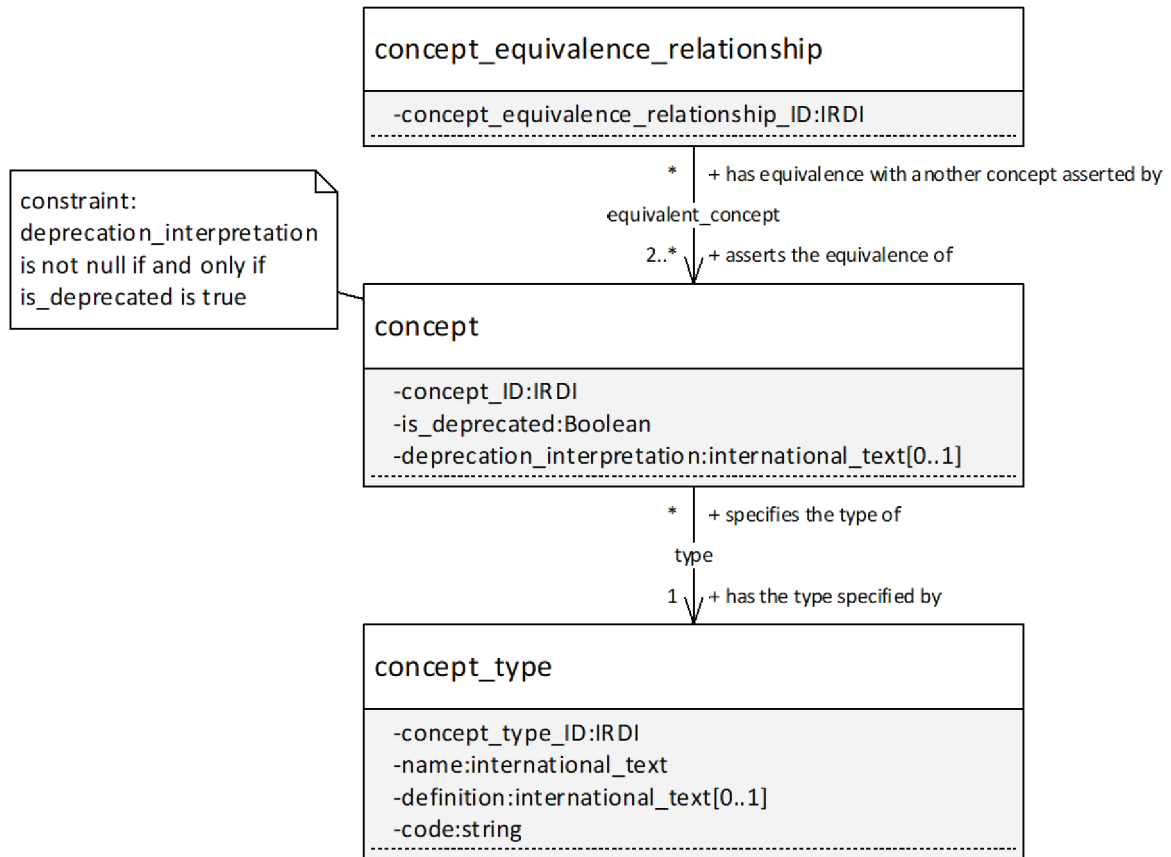
- have a maximum length of 10 characters;
- be a member of a set of sequential values that start with the value "1".

7 Concept dictionary access

7.1 Overview of concept dictionary access

To provide structures to be returned by calls to a terminological data service (see 9.3.2), this clause specifies:

- a conceptual information model for terminological data information in a concept dictionary (see Figure 7, Figure 8 and Figure 9), using Unified Modeling Language (see ISO/IEC 19505-1);
- an exchange file format for the concepts in a concept dictionary (see 10.2), using Extensible Markup Language (XML)^[31] or JavaScript Object Notation (JSON)^[32].



NOTE See ISO/IEC 19505-1 for details on the notation in this diagram.

Figure 7 — UML class diagram of the model for concepts

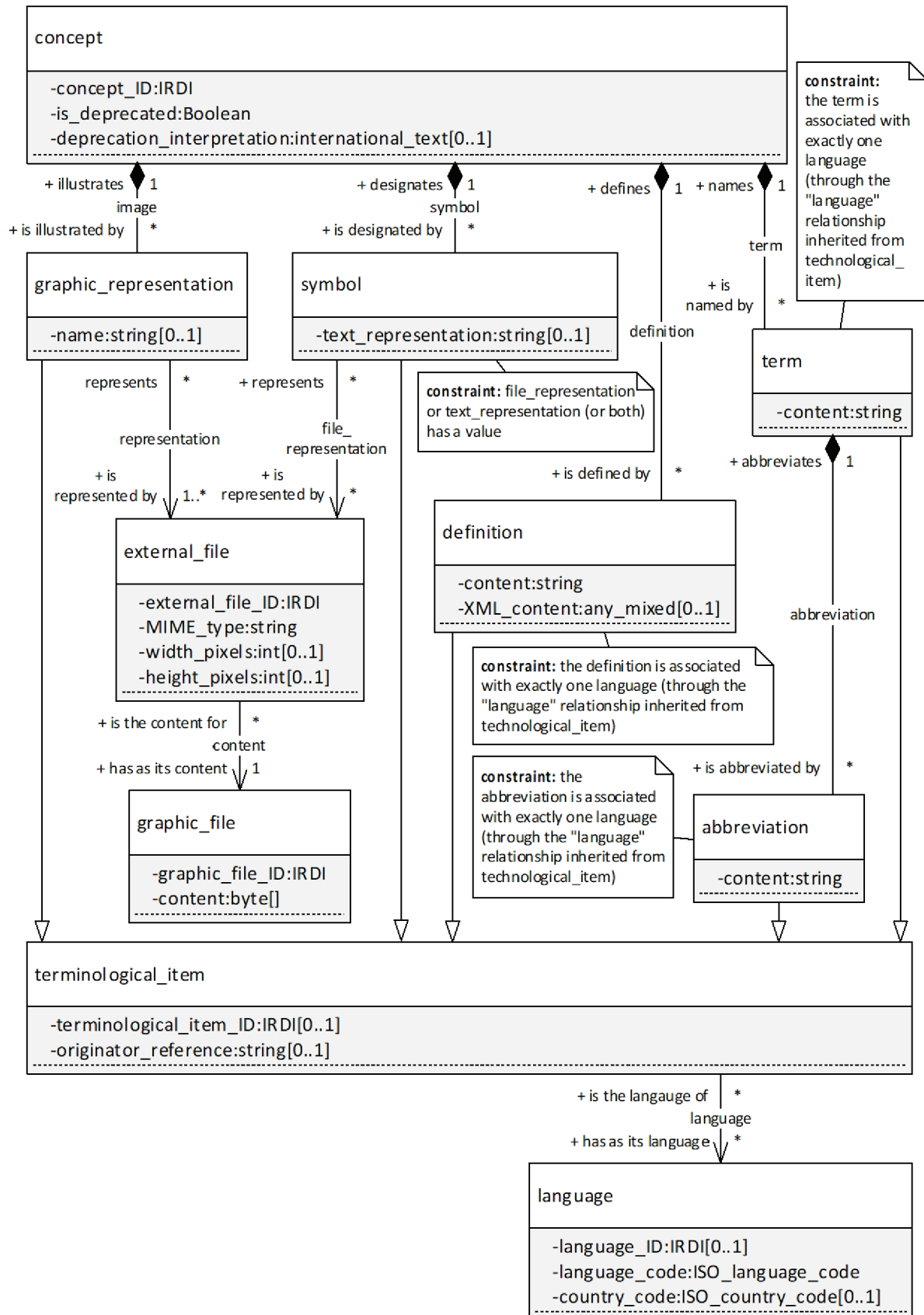
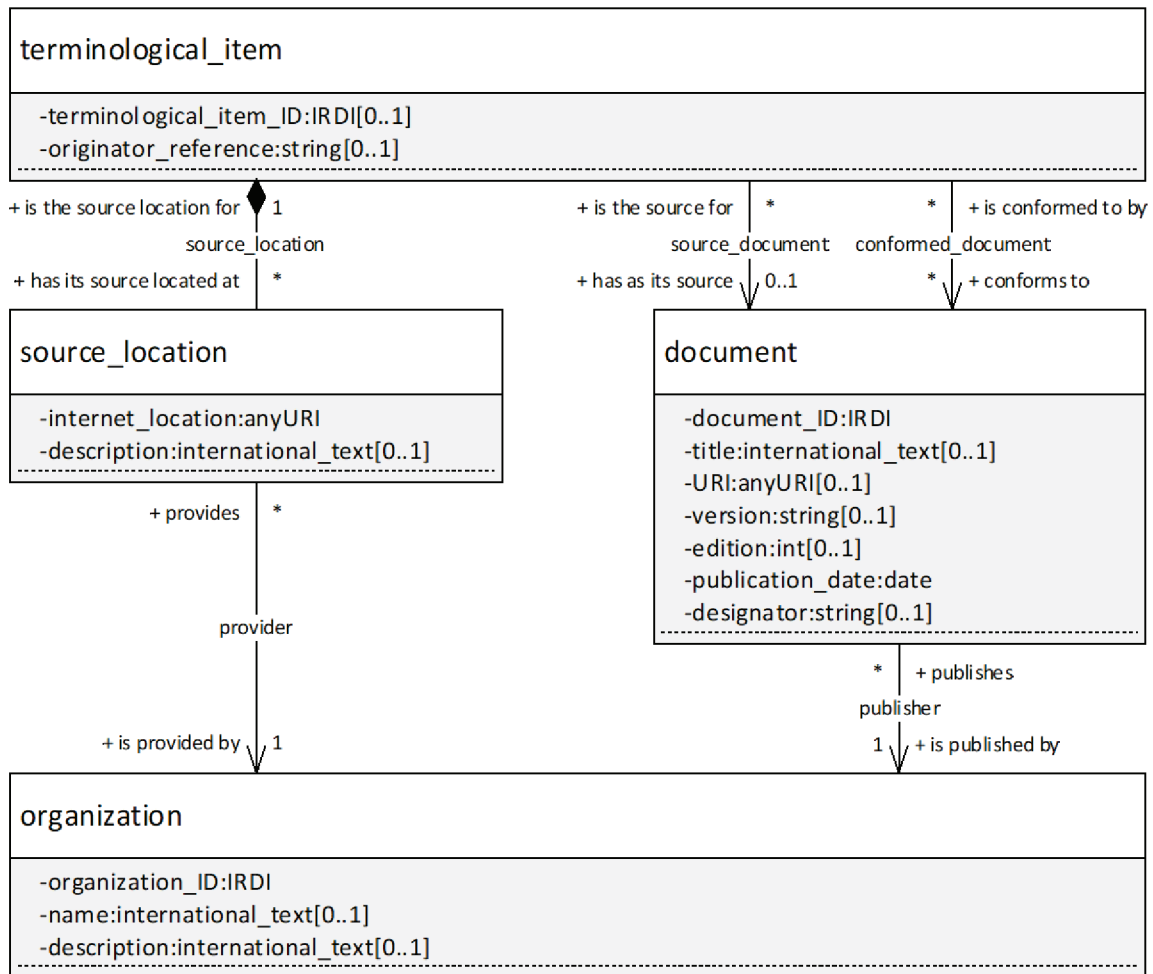


Figure 8 — UML class diagram of the model for terminological items



NOTE See ISO/IEC 19505-1 for details on the notation in this diagram.

Figure 9 — UML class diagram of the model for terminological item sources

7.2 Concept dictionary terminology reference model

7.2.1 Overview of the concept dictionary terminology reference model

The concept dictionary terminology reference model uses the following type specified by this document:

- IRDI (see 6.4). The model of the exchange file format consists of the following entities:
- concept_type (see 7.2.2);
- concept (see 7.2.3);
- concept_equivalence_relationship (see 7.2.4);
- terminological_item (see 7.2.5);
- term (see 7.2.6);
- abbreviation (see 7.2.7);
- definition (see 7.2.8);
- symbol (see 7.2.9);