

# ISO/IEC JTC 1/SC 32 N 1053

Date: 2003-09-03

REPLACES: --

<p style="text-align: center;"><b>ISO/IEC JTC 1/SC 32</b></p> <p style="text-align: center;"><b>Data Management and Interchange</b></p> <p style="text-align: center;"><b>Secretariat: United States of America (ANSI)</b></p> <p style="text-align: center;"><b>Administered by Pacific Northwest National Laboratory on behalf of ANSI</b></p>
--

<b>DOCUMENT TYPE</b>	Working Draft Text
<b>TITLE</b>	Information technology - Achieving Metadata Registry Content Consistency - Part 2: XML Structured Data
<b>SOURCE</b>	Project Editor (Ray Gates)
<b>PROJECT NUMBER</b>	1.32.16.01.02.00
<b>STATUS</b>	For comments and work by WG 2
<b>REFERENCES</b>	
<b>ACTION ID.</b>	FYI
<b>REQUESTED ACTION</b>	
<b>DUE DATE</b>	
<b>Number of Pages</b>	21
<b>LANGUAGE USED</b>	English
<b>DISTRIBUTION</b>	P & L Members SC Chair WG Conveners and Secretaries

Douglas Mann, Secretariat, ISO/IEC JTC 1/SC 32

Pacific Northwest National Laboratory \*, 13600 Angelica Court, Chantilly, VA, 20151-3360,  
United States of America

Telephone: +1 202-566-2126; Facsimile: +1 202-566-1639; E-mail: [MannD@battelle.org](mailto:MannD@battelle.org)

available from the JTC 1/SC 32 WebSite <http://www.jtc1sc32.org/>

\*Pacific Northwest National Laboratory (PNL) administers the ISO/IEC JTC 1/SC 32 Secretariat on behalf of ANSI

## **Information technology — Procedures for achieving metadata registry content consistency — Part 2: XML structured data**

*Élément introductif — Élément central — Partie 2: Titre de la partie*

### **Warning**

This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Editor's Note:** This document is a preliminary Working Draft that is published at this time to keep the project alive, and to solicit contributions to the interim WG2 meeting in Melbourne in October 2003.

Document type: Technical Report  
Document subtype:  
Document stage: (20) Preparatory  
Document language: E

### Copyright notice

This ISO document is a working draft or committee draft and is copyright-protected by ISO. While the reproduction of working drafts or committee drafts in any form for use by participants in the ISO standards development process is permitted without prior permission from ISO, neither this document nor any extract from it may be reproduced, stored or transmitted in any form for any other purpose without prior written permission from ISO.

Requests for permission to reproduce this document for the purpose of selling it should be addressed as shown below or to ISO's member body in the country of the requester:

[Indicate the full address, telephone number, fax number, telex number, and electronic mail address, as appropriate, of the Copyright Manger of the ISO member body responsible for the secretariat of the TC or SC within the framework of which the working document has been prepared.]

Reproduction for sales purposes may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

# Contents

Page

Foreword .....	iv
Introduction.....	vi
1 Scope .....	1
2 Conformance.....	1
3 Normative references .....	1
3.1 ISO/IEC standards.....	1
3.2 W3C Recommendations .....	1
4 Terms and definitions.....	3
4.1 Terms from ISO and ISO/IEC standards.....	3
4.2 Terms from W3C Recommendations.....	3
5 Symbols (and abbreviated terms).....	5
6 XML artefacts to be considered .....	5
6.1 XML document .....	5
6.2 XML namespace.....	5
6.3 XML element.....	5
6.4 XML attribute .....	6
6.5 XML schema .....	6
6.6 XML datatype.....	6
6.7 Document Types Definitions .....	6
7 Mapping XML artefacts to 11179-3 metamodel.....	6
8 Mapping simple XML artefacts.....	7
8.1 Mapping XML tags .....	7
8.2 Mapping XML attributes and elementary XML elements.....	7
9 Mapping XML artefacts – Approach 1 .....	7
9.1 General approach.....	7
9.2 Mapping XML Namespaces .....	7
9.3 XML datatypes.....	8
9.4 XML schemas .....	8
9.5 Document Type Definitions.....	8
9.6 Example mapping of XML to 11179-3 metamodel .....	8
10 Mapping XML artefacts – Approach 2 .....	9
10.1 General Approach .....	9
10.2 Mapping XML Namespaces .....	9
10.3 XML schemas .....	9
10.4 XML datatypes.....	9
Annex A (normative) Annex title .....	13
A.1 General .....	13
Bibliography.....	14

## 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 3.

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.

In exceptional circumstances, the joint technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard (“state of the art”, for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC TR 20943 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 TR 20943-2, which is a Technical Report of type 2, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

ISO/IEC TR 20943 consists of the following parts, under the general title *Information technology — Procedures for achieving metadata registry content consistency*:

- Part 1: Data elements
- *Part 2: XML structured data (this part)*
- Part 3: Value domains
- Part 4: Overview

[Editor’s note: The following help text is a reminder to the editor. It will be deleted from the final document.

In addition to the appropriate boilerplate text (see above) give as many of the following as are appropriate:

- a statement of any other international organization that has contributed to the preparation of the standard

- the relationship of the standard to other standards or documents
- a statement specifying which annexes are normative and which are informative.

End of Help text.]

## Introduction

The ISO/IEC 20943 family of technical reports supplements the ISO/IEC 11179 and ISO/IEC 20944 families of standards, by providing supporting procedures and guidance for applying the standards. This part of ISO/IEC 20943 describes the representation of XML structured data in a 11179-3 metadata registry.

# Information technology — Procedures for achieving metadata registry content consistency — Part 2: XML structured data

## 1 Scope

This part of ISO/IEC 20943 describes ways of representing XML structured data in a 11179-3 metadata registry (hereinafter referred to as "a 11179 MDR" or simply "an MDR"). XML structures may be mapped to, and represented by, one or more constructs in an MDR. ISO/IEC 11179-3:2003 does not explicitly specify how to represent XML structures, and practitioners have found more than one way to represent similar structures using the constructs defined by ISO/IEC 11179-3:2003.

This part describes some possible representations of various XML structures, some pros and cons of each, with techniques for mapping from one to another.

[Editor's Note: An open issue is the relationship between a 11179 MDR and an ebXML registry. There is some overlap between the object types each registry tries to describe, but there are also significant differences. To what extent should this project attempt to address this issue?]

## 2 Conformance

This Technical Report specifies no conformance requirements.

## 3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

### 3.1 ISO/IEC standards

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

### 3.2 W3C Recommendations

[Editor's note: The following documents are included as potential sources of information on XML metadata. Any reference that is not yet a full recommendation by the time this document reached its final stage of progression will need to be moved to the Bibliography. Any we do not use will be removed from the final document]

Extensible Markup Language (XML): <http://www.w3.org/TR/REC-xml>

XML Base <http://www.w3.org/TR/xmlbase>

XML Linking Language (XLink) <http://www.w3.org/TR/xlink/>



XML Namespaces <http://www.w3.org/TR/REC-xml-names>

XML Schema — Part 0: Primer <http://www.w3.org/TR/xmlschema-0/>

XML Schema — Part 1: Structures <http://www.w3.org/TR/xmlschema-1/>

XML Schema — Part 2: Datatypes <http://www.w3.org/TR/xmlschema-2/>

[Editor's note: The following help text is a reminder to the editor. It will be deleted from the final document.

The **Normative reference(s)** clause is an optional element that gives a list of the normative documents to which reference is made in the standard in such a way as to make them indispensable for the application of the standard.

In principle, the normative documents shall be International Standards published by ISO and/or IEC. Normative documents published by other bodies may be listed provided that

- the document is recognized by the ISO and/or IEC committee concerned as having wide acceptance and authoritative status as well as being publicly available,
- the ISO and/or IEC committee concerned has obtained the agreement of the authors or publishers (where known) of the document to its inclusion,
- the authors or publishers (where known) have also agreed to inform the ISO and/or IEC committee concerned of their intention to revise the document and of the points the revision will concern, and
- the ISO and/or IEC committee concerned undertakes to review the situation in the light of any changes in the referenced document.

The normative reference list is introduced by a standard wording.

Type 3 Technical Reports are not permitted to contain normative matter, and shall not contain “normative references”. They may, however, contain “references”.

The list shall not include the following:

- documents that are not publicly available;
- documents to which only informative reference is made;
- documents which have merely served as references in the preparation of the standard.

Such documents may be listed in a bibliography.

Normative references shall be either dated (i.e. to a specific edition) or undated.

For dated references, each shall be given with its year of publication, or, in the case of enquiry or final drafts, with a dash together with a footnote “To be published.”, and full title. Subsequent amendments to, or revisions of, dated references will need to be incorporated by amendment of the standard referring to them. References to specific divisions or subdivisions, tables and figures of another document shall always be dated.

Undated references may be made only to a complete document or a part thereof and only in the following cases:

- a) if it is accepted that it will be possible to use all future changes of the document referred to for the purposes of the referring standard;
- b) for informative references.

Undated references shall be understood to include all amendments to and revisions of the quoted publication. The year of publication or dash shall not be given for undated references. When an undated reference is to all parts of a

standard, the publication number shall be followed by the indication “(all parts)” and the general title of the series of parts (i.e. the introductory and main elements).

End of Help text.]

## 4 Terms and definitions

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

[Editor’s note: More terms and definitions will be added later.]

### 4.1 Terms from ISO and ISO/IEC standards

#### 4.1.1

##### **Administered item**

*text of the definition*

[ISO/IEC 11179-3:2003 (n.n.n)].

#### 4.1.2

##### **Context**

*text of the definition*

[ISO/IEC 11179-3:2003 (n.n.n)].

#### 4.1.3

##### **Data element**

*text of the definition*

[ISO/IEC 11179-3:2003 (n.n.n)].

#### 4.1.4

##### **Designation**

*text of the definition*

[ISO/IEC 11179-3:2003 (n.n.n)].

### 4.2 Terms from W3C Recommendations

#### 4.2.1

##### **Datatype**

⟨XML Schema⟩ a 3-tuple, consisting of a) a set of distinct values, called its ·value space·, b) a set of lexical representations, called its ·lexical space·, and c) a set of ·facet·s that characterize properties of the ·value space·, individual values or lexical items.

[<http://www.w3.org/TR/xmlschema-2/#datatype> 2.1].

#### 4.2.2

##### **Lexical space**

⟨XML Schema⟩ the set of valid *literals* for a datatype

EXAMPLE: "100" and "1.0E2" are two different literals from the **lexical space** of "float" which both denote the same value. The type system defined in this specification provides a mechanism for schema designers to control the set of values and the corresponding set of acceptable literals of those values for a datatype.

NOTE: The literals in the **lexical spaces** defined in this specification have the following characteristics:

### Interoperability:

The number of literals for each value has been kept small; for many datatypes there is a one-to-one mapping between literals and values. This makes it easy to exchange the values between different systems. In many cases, conversion from locale-dependent representations will be required on both the originator and the recipient side, both for computer processing and for interaction with humans.

### Basic readability:

Textual, rather than binary, literals are used. This makes hand editing, debugging, and similar activities possible.

### Ease of parsing and serializing:

Where possible, literals correspond to those found in common programming languages and libraries.

[<http://www.w3.org/TR/xmlschema-2/#dt-lexical-space> 2.3].

### 4.2.3

#### root

#### document element

⟨XML document⟩ There is exactly one element, called the **root**, or document element, no part of which appears in the content of any other element.

Note: For all other elements, if the start-tag is in the content of another element, the end-tag is in the content of the same element. More simply stated, the elements, delimited by start- and end-tags, nest properly within each other.

[<http://www.w3.org/TR/REC-xml#NT-document> 2.1]

### 4.2.4

#### Value space

⟨XML schema⟩ the set of values for a given **datatype**.

Note: Each value in the **value space** of a datatype is denoted by one or more literals in its **lexical space**.

[<http://www.w3.org/TR/xmlschema-2/ - dt-value-space> 2.2]

### 4.2.5

#### XML document

Each XML document contains one or more **elements**, the boundaries of which are either delimited by start-tags and end-tags, or, for empty elements, by an empty-element tag. Each element has a type, identified by name, sometimes called its "generic identifier" (GI), and may have a set of attribute specifications.] Each attribute specification has a name and a value.

Note: the term "document" is used loosely in XML, since there is no requirement for there to be a document per se – there may just be a data stream exchanged by two or more applications.

[<http://www.w3.org/TR/REC-xml#sec-documents> 2]

[Editor's note: The following help text is a reminder to the editor. It will be deleted from the final document.]

The **Terms and definitions** clause is an optional element giving definitions necessary for the understanding of certain terms used in the standard.

The term and definition list is introduced by a standard wording, which shall be modified as appropriate.

Rules for the drafting and presentation of terms and definitions are given in the ISO/IEC Directives, Part 3, 1997<sup>[2]</sup>, annex C, and in ISO 10241<sup>[3]</sup>.

End of Help text.]

## 5 Symbols (and abbreviated terms)

[Editor's note: Symbols used will be added later. If none are used, the clause will be deleted.]

TBD.

[Editor's note: The following help text is a reminder to the editor. It will be deleted from the final document.

The **Symbols (and abbreviated terms)** clause is an optional element giving a list of the symbols and abbreviated terms necessary for the understanding of the standard.

Unless there is a need to list symbols in a specific order to reflect technical criteria, all symbols should be listed in alphabetical order in the following sequence:

- upper case Latin letter followed by lower case Latin letter (*A, a, B, b*, etc.);
- letters without indices preceding letters with indices, and with letter indices preceding numerical ones (*B, b, C, C<sub>m</sub>, C<sub>2</sub>, c, d, d<sub>ext</sub>, d<sub>int</sub>, d<sub>1</sub>*, etc.);
- Greek letters following Latin letters (*Z, z, A, α, B, β ... Λ, λ*, etc.);
- any other special symbols.

End of Help text.]

## 6 XML artefacts to be considered

Extensible Markup Language (XML) is specified by W3C recommendation REC-xml, and also as ISO/IEC nnnn.

There is a growing family of related standards that are relevant to describing XML metadata (see 3.2).

A 11179 MDR is used to record and describe meta data, specifically: data elements, data element concepts, conceptual domains and value domains. The current edition of ISO/IEC 11179-3 has limited support for data groups and data relationships.

This clause considers the XML artefacts most appropriate to be recorded in and/or mapped to an MDR.

### 6.1 XML document

Because an MDR contains metadata rather than data, it will usually not be appropriate to store information about individual documents. Instead, it is more appropriate to store information about document types, as described by an XML Schema or Document Type Definition (DTD). However, an exception to this general rule would be documents using WSDL, or other definition language. While from an XML perspective, a WSDL document is an instance document, the document defines a type of web service, and therefore is itself metadata at another level.

### 6.2 XML namespace

XML namespaces provide for uniqueness of names in XML and will be essential in recording metadata in an MDR.

### 6.3 XML element

An XML element is defined in [ref. REC-xml] as: [please see the reference for detailed explanations]

[39] **element** ::= EmptyElemTag | STag content ETag

and

[43] **content** ::= (element | CharData | Reference | CDsect | PI | Comment)\*

An XML element that contains only CharData is the XML equivalent of a data element in 11179-3 and is a natural candidates for recording in an MDR. As with data elements, an MDR will record types of XML elements, rather than instances. However, XML elements that contain other XML elements are effectively data groups, and there are several ways of mapping such data groups to the 11179-3 metamodel.

### 6.4 XML attribute

XML attributes may occur within the Start tag of an XML element [see ref. REC-xml]:

[40] **STag** ::= '<' Name (S Attribute)\* S? '>'

[41] **Attribute** ::= Name Eq AttValue

An XML attribute also compares well to a data element in an MDR. This is not surprising, since the choice between XML attributes and XML elements in the design of an XML document type is somewhat arbitrary. Therefore, we can expect to record XML attributes in much the same way as elementary XML elements, but will need some way to differentiate the two.

### 6.5 XML schema

An XML schema defines a class of XML documents. It is equivalent to a record definition in more traditional data processing applications. It represents a data group, for which there are several ways of mapping to the 11179-3 metamodel.

### 6.6 XML datatype

An XML datatype is an XML schema construct that allows the datatype of an XML element to be specified. Elements may be primitive or derived.

### 6.7 Document Types Definitions

Document type definitions (DTDs) were a precursor to XML schemas. They are generally less powerful than XML schema, and use a different syntax.

## 7 Mapping XML artefacts to 11179-3 metamodel

The 11179 metamodel does not explicitly define XML artefacts. Instead, we can map XML artefacts onto 11179-3 metamodel constructs. There is more than one way to do such mappings. This clause provides an overview of various approaches, which are then described in more detail in subsequent clauses.

XML artefact	Mapping Approach 1 (from Ref 3.)	Mapping Approach 2 (from Refs 1 & 2)
XML Tag	Designation	Designation
XML Element	Data Element	Data Element
XML Attribute	Data Element	Data Element (not specified in references)
XML Namespace	Context	Classification Scheme
XML Group Object	Derived Data Element or new Group	Classification Scheme

XML artefact	Mapping Approach 1 (from Ref 3.)	Mapping Approach 2 (from Refs 1 & 2)
	Object in 11179	
XML Datatypes	Datatype	Classification Scheme Item
XML Schema	Derived Data Element??	Classification Scheme
XML Schema Datatype	Datatype	Classification Scheme Item
Other		Use Context to distinguish designations for XML tags vs XML Schema.

## 8 Mapping simple XML artefacts

A single approach is proposed to mapping the following XML artifacts:

- XML tags
- XML attributes
- elementary XML elements

### 8.1 Mapping XML tags

In the 11179-3 metamodel **Designations** represent names, and Designations are defined within a **Context**. Therefore, the names (or tags) that identify XML element types will be mapped to designations. Similarly, attribute names will be mapped to Designations within a Context. Each designation needs to be associated with a particular type of Administered Item.

### 8.2 Mapping XML attributes and elementary XML elements

Elementary XML elements (i.e. those without child elements) and XML attributes will be mapped Data Elements in the MDR.

[Editor's note: We need a way to distinguish Data Elements that represent XML elements from those that represent XML attributes.]

## 9 Mapping XML artefacts – Approach 1

### 9.1 General approach

The approach taken in this clause is to map each XML artefact to its closest 11179 equivalent. The rationale is that by following 11179-3 model as closely as possible, interoperability among registries will be maximized.

### 9.2 Mapping XML Namespaces

In the ISO/IEC 11179-3:2003 metamodel, the namespace for names of Administered Items is the **Context** of the Administered Item. Therefore, an XML namespace will be mapped to a Context.

[Editor's note: The following comment has previously been provided by Shawn Jones of US EPA on the use of Context to represent XML Name Spaces. We need to consider this comment as we expand this description. The suggested representation of XML Name Spaces by Classification Schemes will be presented in clause 10

<begin comment>

In the EDR, we store data system metadata as a CLASS\_SCHEME and relate the DATA\_ELEMENTS to it through CLASS\_SCHEME\_ITEM. That way, if we also load the support documents as different CLASS\_SCHEMES, we can relate the documents to the EPA standard record.

Through my analysis of XML grouping objects (datatype, schema, etc.), I felt they equate more to a data system or other grouping objects (data standard, regulation, dictionary, etc.) than to the 11179 DATATYPE or DATA\_ELEMENT\_DERIVATION. By mapping them to CLASS\_SCHEME we, in our experience with EDR, gain a tremendous amount of flexibility in relating all of the ADMINISTRATIVE ITEMS together.

If the Namespaces were recorded as a CONTEXT record, we could not build any other relationships to the namespace. Using the CLASS\_SCHEME method, we could relate all elementary data elements as ADMINISTERED COMPONENTS to the namespace CLASS\_SCHEME record through CLASS\_SCHEME\_ITEM, and any other objects (CLASS\_SCHEME) that might be related to it (trading partner agreement, data system, supporting example documents, namespace rules documents, etc. would be documented as a CLASS\_SCHEME\_TYPE). The CLASS\_SCHEME method provides limitless relationships. The XML tags for the data elements would be specified by a CONTEXT that is also owned by the namespace CLASS\_SCHEME as it is an ADMINISTERED COMPONENT and therefore can be a CLASS\_SCHEME\_ITEM.

<end comment>

End of Editor's Note.]

### 9.3 XML datatypes

Represent XML and XML Schema Datatypes as Datatypes in 11179.

For example, the XML Schema "int" datatype might be specified as:

datatype\_name = "int"

datatype\_scheme\_reference = "<http://www.w3.org/TR/xmlschema-2/>".

### 9.4 XML schemas

*To be added.*

### 9.5 Document Type Definitions

*To be added.*

### 9.6 Example mapping of XML to 11179-3 metamodel

*To be added.*

## 10 Mapping XML artefacts – Approach 2

### 10.1 General Approach

This clause uses classification schemes for all XML artefacts except XML elements and XML attributes. The rationale is to support more flexible relationships among these constructs than is possible with the existing 11179-3 metamodel.

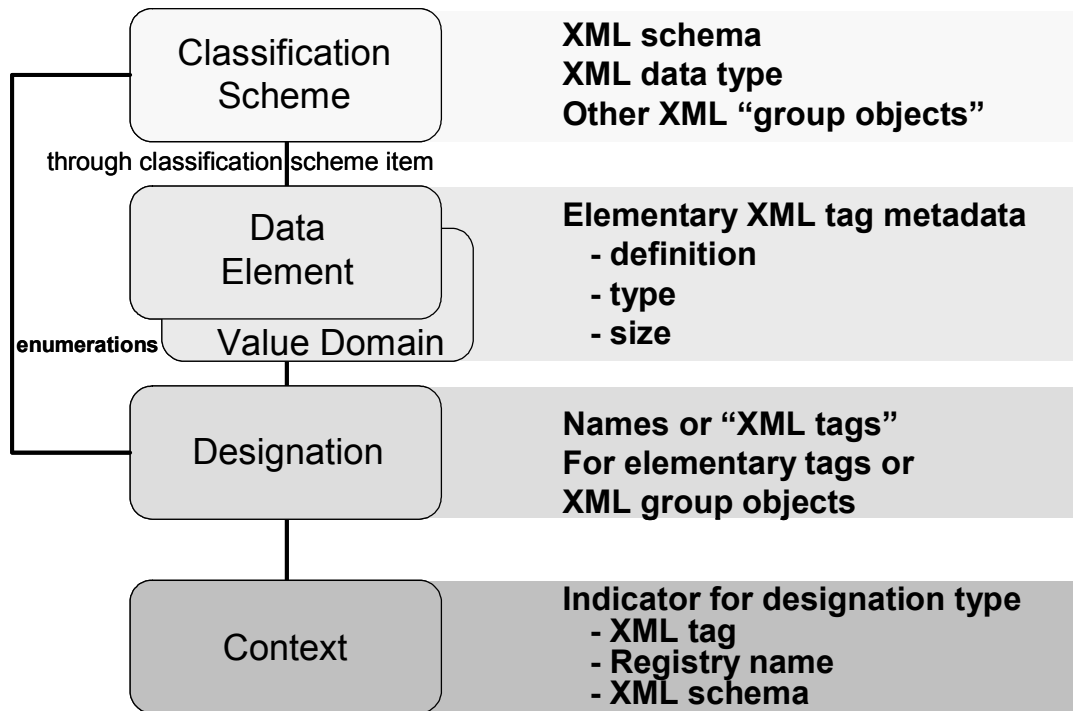


Figure 1: Mapping XML artefacts to MDR - Approach 2

### 10.2 Mapping XML Namespaces

XML namespaces will be mapped to classification schemes.

### 10.3 XML schemas

*To be added.*

### 10.4 XML datatypes

*To be added.*



*[Editor's note: The following help text is a reminder to the editor. It will be deleted from the final document.]*

A subclause shall not be created unless there is at least one further subclause at the same level. For example, a piece of text in clause 10 shall not be designated subclause "10.1" unless there is also a subclause "10.2".

Each primary subclause should preferably be given a title, which shall be placed immediately after its number, on a line separate from the text that follows it. Secondary subclauses may be treated in the same way. Within a clause or subclause, the use of titles shall be uniform for subclauses at the same level, e.g. if 10.1 has a title, 10.2 shall also have a title. In the absence of titles, key terms or phrases (composed in distinctive type) appearing at the beginning of the text of the subclause may be used to call attention to the subject matter dealt with. Such terms or phrases will not be listed in the table of contents.

**Notes** integrated in the text of a standard shall only be used for giving additional information intended to assist the understanding or use of the standard and shall not contain provisions to which it is necessary to conform in order to be able to claim compliance with the standard.

These elements should preferably be placed at the end of the clause or subclause, or after the paragraph, to which they refer.

A single note in a clause or subclause shall be preceded by "NOTE", placed at the beginning of the first line of the text of the note. When several notes occur within the same clause or subclause, they shall be designated "NOTE 1", "NOTE 2", "NOTE 3", etc.

**Examples** integrated in the text of a standard shall only be used for giving additional information intended to assist the understanding or use of the standard and shall not contain provisions to which it is necessary to conform in order to be able to claim compliance with the standard.

These elements should preferably be placed at the end of the clause or subclause, or after the paragraph, to which they refer.

A single example in a clause or subclause shall be preceded by "EXAMPLE", placed at the beginning of the first line of the text of the example. When several examples occur within the same clause or subclause, they shall be designated "EXAMPLE 1", "EXAMPLE 2", "EXAMPLE 3", etc.

**Footnotes** to the text give additional information; their use shall be kept to a minimum. They shall not contain requirements.

**Lists** may be introduced by a sentence, a complete grammatical proposition followed by a colon, or by the first part of a proposition (without a colon), completed by the items in the list.

Two types of list are commonly used: an ordered list in which each list item is preceded by an item reference; an unordered list in which each list item is preceded by a dash. An ordered list shall be used when it is needed to make reference to individual list items.

Key terms or phrases may be composed in distinctive type to call attention to the subject matter dealt with in the various list items. Such terms or phrases will not be listed in the table of contents; if it is a requirement that they are listed, they shall not be presented as list items but as subclause titles.

**Figures** should be used wherever appropriate to present information in an easily comprehensible form. It shall be possible to refer to each figure explicitly within the text.

One level of subdivision only is permitted [e.g. Figure 1 may be subdivided as a), b), c), etc.].

Figures shall be numbered with arabic numerals, beginning with 1. This numbering shall be independent of the numbering of the clauses and of any tables. A single figure shall be designated "Figure 1". The numbering shall be continuous up to but excluding any annexes. Numbers given to the figures of an annex shall be preceded by the letter designating that annex followed by a full-stop. The numbering shall start afresh with each annex.

The title shall be centred horizontally below the figure and laid out as shown in the preceding example.

**Notes to figures** shall be treated independently from notes integrated in the text. They shall be located above the title of the relevant figure and shall precede figure footnotes. A single note in a figure shall be preceded by “NOTE”, placed at the beginning of the first line of the text of the note. When several notes occur in the same figure, they shall be designated “NOTE 1”, “NOTE 2”, “NOTE 3”, etc. A separate numbering sequence shall be used for each figure.

Notes to figures shall not contain requirements. Any requirements relating to the content of a figure shall be given in the text, in a footnote to the figure or as a paragraph between the figure and its title. It is not necessary that notes to figures are referred to.

**Footnotes to figures** shall be treated independently from footnotes to the text. They shall be located immediately above the title of the relevant figure, and shall follow figure notes.

Footnotes to figures shall be distinguished by superscript lower-case letters, beginning with “a”. The footnotes shall be referred to in the figure by inserting the same superscript lower-case letter.

Footnotes to figures may contain requirements. As a consequence, it is particularly important when drafting the text of the figure footnote to distinguish clearly between different types of provision by using the appropriate verbal forms (see the ISO/IEC Directives, Part 3, 1997, annex E).

**Tables** should be used wherever appropriate to present information in an easily comprehensible form. It shall be possible to refer to each table explicitly within the text.

A table within a table is not permitted. Subdivision of a table into subsidiary tables is not permitted.

Tables shall be numbered with arabic numerals, beginning with 1. This numbering shall be independent of the numbering of the clauses and of any figures. A single table shall be designated “Table 1”. The numbering shall be continuous up to but excluding any annexes. Numbers given to the tables of an annex shall be preceded by the letter designating that annex followed by a full-stop. The numbering shall start afresh with each annex.

The title shall be centred horizontally above the table and laid out as shown in the preceding example.

The first word in the heading of each column shall begin with a capital letter. The units used in a given column shall generally be indicated under the column heading. As an exception to this rule, when all units are the same, a suitable statement shall instead be placed above the right-hand corner of the table, as shown in the preceding example.

The column headings together with any statement concerning units shall be repeated on all pages after the first.

**Notes to tables** shall be treated independently from notes integrated in the text. They shall be located within the frame of the relevant table and shall precede table footnotes. A single note in a table shall be preceded by “NOTE”, placed at the beginning of the first line of the text of the note. When several notes occur in the same table, they shall be designated “NOTE 1”, “NOTE 2”, “NOTE 3”, etc. A separate numbering sequence shall be used for each table.

Notes to tables shall not contain requirements. Any requirements relating to the content of a table shall be given in the text, in a footnote to the table or as a paragraph within the table. It is not necessary that notes to tables are referred to.

**Footnotes to tables** shall be treated independently from footnotes to the text. They shall be located within the frame of the relevant table, and shall follow table notes.

Footnotes to tables shall be distinguished by superscript lower-case letters, beginning with “a”. The footnotes shall be referred to in the table by inserting the same superscript lower-case letter.

Footnotes to tables may contain requirements. As a consequence, it is particularly important when drafting the text of the table footnote to distinguish clearly between different types of provision by using the appropriate verbal forms (see the ISO/IEC Directives, Part 3, 1997, annex E).

**Equations** between quantities are preferred to equations between numerical values (see the ISO/IEC Directives, Part 3, 1997, 6.6.9.1). Equations shall be expressed in mathematically correct form, the variables being represented by letter symbols the meanings of which are explained in connection with the equations, unless they appear in a “Symbols and abbreviated terms” clause (see the ISO/IEC Directives, Part 3, 1997, 6.3.2). Descriptive terms or names of quantities shall not be arranged in the form of an equation.

If it is necessary to number some or all of the formulae in a standard in order to facilitate cross-reference, arabic numbers in parentheses shall be used, beginning with 1. The numbering shall be consecutive and independent of the numbering of clauses, tables and figures.

Numbers given to the formulae of an annex shall be preceded by the letter designating that annex followed by a full-stop. The numbering shall start afresh with each annex.

The International System of units (SI) as set out in ISO 31<sup>[4]</sup> shall be used. Symbols for quantities shall be chosen, wherever possible, from the various parts of ISO 31 and IEC 60027<sup>[5]</sup>. For further guidance on application, see ISO 1000<sup>[6]</sup>.

The units in which any values are expressed shall be indicated.

The decimal sign shall be a comma on the line in all language versions of International Standards.

For clarity, the symbol  $\times$  rather than a point shall be used to indicate multiplication of numbers and numerical values.

If a value less than 1 is written in decimal form, the decimal sign shall be preceded by a zero.

For further information, see the ISO/IEC Directives, Part 3, 1997, 6.6.7 to 6.6.10.

Use the style **Special** for any element of text for which you are unsure as to the correct style to use, or for which you feel that none of the styles contained in the template is appropriate. Note that if you create your own style(s), they will be mapped to Special on exportation/importation.

[End of Help text.]

## **Annex A** (normative)

### **Annex title**

#### **A.1 General**

*[Editor's note: The following help text is a reminder to the editor. It will be deleted from the final document.]*

**Annexes** shall appear in the order in which they are cited in the text. Each annex shall be designated by a heading comprising the word “Annex” followed by a capital letter designating its serial order, beginning with “A”, e.g. “Annex A”. The annex heading shall be followed by the indication “(normative)” or “(informative)”, and by the title, each on a separate line. Numbers given to the clauses, subclauses, tables, figures and mathematical formulae of an annex shall be preceded by the letter designating that annex followed by a full-stop. The numbering shall start afresh with each annex. A single annex shall be designated “Annex A”.

**Normative annexes** are integral parts of the standard. Their presence is optional. An annex's normative status (as opposed to informative) shall be made clear by the way in which it is referred to in the text, by a statement to this effect in the foreword and by an indication in the table of contents and under the heading of the annex.

**Informative annexes** give additional information intended to assist the understanding or use of the standard and shall not contain provisions to which it is necessary to conform in order to be able to claim compliance with the standard. Their presence is optional. An annex's informative status (as opposed to normative) shall be made clear by the way in which it is referred to in the text, by a statement to this effect in the foreword and by an indication in the table of contents and under the heading of the annex.

*[End of Help text.]*

## Bibliography

*[Editor's Note: The WG2 documents are included for reference during the Preparatory stage only. They will be removed once the document progresses to DTR, at which point any material in those documents of value to this TR should already have been included.]*

- [1] WG2-SAF-004 Tutorial on XML Tag and Schema registration in an ISO/IEC 11179 Metadata Registry, Kathleen Gundry, 2003-01-21.
- [2] WG2-SAF-005 XML in Environmental Data Registry, EPA, 2003-01-21.
- [3] WG2-SAF-006 Representing XML in MDR, Ray Gates, 2003-01-30
- [4] WG2-SAF-007 Response to WG2-SAF-006, Shawn Jones, EPA, 2003-01-30

*[Editor's note: The following help text is a reminder to the editor. It will be deleted from the final document.]*

A **Bibliography**, if present, shall appear after the last annex. The drafting rules set out in ISO 690<sup>[7]</sup> shall be followed.

The bibliography may include

- documents that are not publicly available,
- documents to which only informative reference is made, and
- documents which have merely served as references in the preparation of the standard.

*[End of Help text.]*