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**Information technology — Multimedia  
content description interface —**

**Part 10:  
Schema definition**

*Technologies de l'information — Interface de description du contenu  
multimédia —*  
*Partie 10: Définition de schéma*

[ISO/IEC 15938-10:2005](https://standards.iso.org/iso-iec/15938-10:2005)

<https://standards.iteh.ai/catalog/standards/sist/3145ee21-e53d-41e9-8522-284851767240/iso-iec-15938-10-2005>

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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

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

ISO/IEC 15938-10 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 15938 consists of the following parts, under the general title *Information technology — Multimedia content description interface*:

- *Part 1: Systems* <https://standards.iteh.ai/catalog/standards/sist/3145ee21-e53d-41e9-8522-284851767240/iso-iec-15938-10-2005>
- *Part 2: Description definition language*
- *Part 3: Visual*
- *Part 4: Audio*
- *Part 5: Multimedia description schemes*
- *Part 6: Reference software*
- *Part 7: Conformance testing*
- *Part 8: Extraction and use of MPEG-7 descriptions*
- *Part 9: Profiles and levels*
- *Part 10: Schema definition*
- *Part 11: MPEG-7 profile schemas*

## Introduction

This International Standard, also known as "Multimedia Content Description Interface," provides a standardized set of technologies for describing multimedia content. It addresses a broad spectrum of multimedia applications and requirements by providing a metadata system for describing the features of multimedia content.

The following are specified in this International Standard:

- **Description Schemes (DS)** describe entities or relationships pertaining to multimedia content. Description Schemes specify the structure and semantics of their components, which may be Description Schemes, Descriptors, or datatypes.
- **Descriptors (D)** describe features, attributes, or groups of attributes of multimedia content.
- **Datatypes** are the basic reusable datatypes employed by Description Schemes and Descriptors.
- **Systems tools** support delivery of descriptions, multiplexing of descriptions with multimedia content, synchronization, file format, and so forth.

This International Standard is subdivided into 10 parts:

**Part 1 – Systems:** specifies the tools for preparing descriptions for efficient transport and storage, compressing descriptions, and allowing synchronization between content and descriptions.

**Part 2 – Description definition language:** specifies the language for defining the standard set of description tools (DSs, Ds, and datatypes) and for defining new description tools.

**Part 3 – Visual:** specifies the description tools pertaining to visual content.

**Part 4 – Audio:** specifies the description tools pertaining to audio content.

**Part 5 – Multimedia description schemes:** specifies the generic description tools pertaining to multimedia including audio and visual content.

**Part 6 – Reference software:** provides a software implementation of the International Standard.

**Part 7 – Conformance testing:** specifies the guidelines and procedures for testing conformance of implementations of the International Standard.

**Part 8 – Extraction and use of MPEG-7 descriptions:** provides guidelines and examples of the extraction and use of descriptions.

**Part 9 – Profiles and levels:** specifies profiles of description tools.

**Part 10 – Schema definition:** specifies the schema using Description Definition Language.

This document specifies the schema of the ISO/IEC 15938 standard by collecting the description tools specified in the ISO/IEC 15938, assigning a namespace designator, and specifying the resulting syntax description in a single schema using description definition language.

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# Information technology — Multimedia content description interface —

## Part 10: Schema definition

### 1 Scope

#### 1.1 Organization of the document

This International Standard specifies a metadata system for describing multimedia content. This part of ISO/IEC 15938 specifies the schema definition across all parts of ISO/IEC 15938. This part of ISO/IEC 15938 collects the description tools specified in ISO/IEC 15938, assigns a namespace designator, and specifies the resulting syntax description in a single schema using description definition language from ISO/IEC 15938-2.

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### 2 Normative references (standards.iteh.ai)

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

ISO/IEC 15938 (Parts 1, 2, 3, 4, 5), *Information technology — Multimedia content description interface*

XML, *Extensible Markup Language (XML) 1.0*, October 2000

XML Schema, *W3C Recommendation*, 2 May 2001

XML Schema Part 0: *Primer*, W3C Recommendation, 2 May 2001

XML Schema Part 1: *Structures*, W3C Recommendation, 2 May 2001

XML Schema Part 2: *Datatypes*, W3C Recommendation, 2 May 2001

xPath, *XML Path Language*, W3C Recommendation, 16 November 1999

NOTE These documents are maintained by the W3C (<http://www.w3.org>). The relevant documents can be obtained as follows:

*Extensible Markup Language (XML) 1.0 (Second Edition)*, 6 October 2000, <http://www.w3.org/TR/2000/REC-xml-20001006/>;

*XML Schema: W3C Recommendation*, 2 May 2001, <http://www.w3.org/XML/Schema>;

*XML Schema Part 0: Primer*, W3C Recommendation, 2 May 2001, <http://www.w3.org/TR/xmlschema-0/> ;

*XML Schema Part 1: Structures*, W3C Recommendation, 2 May 2001, <http://www.w3.org/TR/xmlschema-1/>;

*XML Schema Part 2: Datatypes*, W3C Recommendation, 2 May 2001, <http://www.w3.org/TR/xmlschema-2/>;

*xPath, XML Path Language*, W3C Recommendation, 16 November 1999, <http://www.w3.org/TR/1999/REC-xpath-19991116>; and

Canonical XML Version 1.0, W3C Recommendation, 15 March 2001, <http://www.w3.org/TR/2001/REC-xml-c14n-20010315>.

### 3 Terms and definitions

#### 3.1 Conventions

##### 3.1.1 Description tools

This part of ISO/IEC 15938 specifies conformance for descriptions and bitstreams complying with ISO/IEC 15938. Descriptions are instances of description tools defined in ISO/IEC 15938. The important concepts are defined as follows:

- **Description Tool (or tool)** – refers to a Description Scheme, Descriptor, or Datatype.
- **Description Scheme (DS)** – a description tool that describes entities or relationships pertaining to multimedia content. DSs specify the structure and semantics of their components, which may be Description Schemes, Descriptors, or datatypes.
- **Descriptor (D)** – a description tool that describes a feature, attribute, or group of attributes of multimedia content.
- **Datatype** – a basic reusable datatype employed by Description Schemes and Descriptors.

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##### 3.1.2 Naming convention

In order to specify the description tools, constructs provided by the Description Definition Language (DDL) specified in ISO/IEC 15938-2 are used, such as "element," "attribute," "simpleType" and "complexType." The names associated to these constructs are created on the basis of the following conventions:

- If the name is composed of multiple words, the first letter of each word is capitalized, with the exception that the capitalization of the first word depends on the type of construct as follows:
- Element naming: the first letter of the first word is capitalized (e.g. `TimePoint` element of `TimeType`).
- Attribute naming: the first letter of the first word is not capitalized (e.g. `timeUnit` attribute of `IncrDurationType`).
- complexType naming: the first letter of the first word is capitalized, and the suffix "Type" is used at the end of the name (e.g. `PersonType`).
- simpleType naming: the first letter of the first word is not capitalized, the suffix "Type" may be used at the end of the name (e.g. `timePointType`).

Note: when referencing a complexType or simpleType in the definition of a description tool, the "Type" suffix is not used. For instance, the text refers to the "Time datatype" (instead of "TimeType datatype"), to the "MediaLocator D" (instead of "MediaLocatorType D") and to the "Person DS" (instead of PersonType DS).



### 3.1.3 Documentation convention

The syntax of each description tool is specified using the constructs provided by the DDL specified in ISO/IEC 15938-2, and is presented in this document using a specific font and background as shown in the following example:

```
<complexType name="ExampleType">
  <sequence>
    <element name="Element1" type="string"/>
  </sequence>
  <attribute name="attribute1" type="string" default="attrvalue1"/>
</complexType>
```

The semantics of each description tool is specified in text using a table format, where each row contains the name and a definition of a type, element or attribute as shown in the following example:

<i>Name</i>	<i>Definition</i>
ExampleType	Specifies an ...
element1	Describes the ...
attribute1	Describes the ...

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Diagrammatic notation is sometimes used to depict overviews of the description tools. Such overview diagrams generally depict aggregation and generalization relationships between description tools or the entities being described. In these diagrams, rectangular shapes containing a name denote description tools (DSs or Ds) that are used to describe entities. In some diagrams, multiple description tools are listed in a single rectangle. Large diamond shapes containing a name denote description tools (DSs or Ds) that are used to describe relationships. Furthermore, paths between rectangles or diamonds denote association, generalization or aggregation relationships. Generalization relationships are indicated by a solid path with a filled triangle pointing at the more general entity. Aggregation (composition) relationships are indicated by a solid path with a (filled) diamond at the aggregating (composing) entity. Aggregation relationship paths may be accompanied by an indication of the multiplicity (minOccurs, maxOccurs) of the relation in text form.

The informative examples are included in separate subclauses, and are presented in this document using a separate font and background as shown in the following example:

```
<Example attribute1="example attribute value">
  <Element1>example element content</Element1>
</Example>
```

Moreover, the schema or set of description tools defined in this document follows a type-centric approach. The description tools are specified by defining the complexType or simpleType for each tool, but not declaring an element of this type at the global scope with the exception of the root element. However, in order to illustrate informative example descriptions in this document, the examples assume that an element of the example type (complexType or simpleType) has been declared, such as a member of another complexType or simpleType. For example, the description above assumes that the following declaration has been made:

```
<element name="Example" type="mpeg7ver1:ExampleType">
```

The term "reserved" is used in specifying the semantics of some description tools. The term "reserved" indicates that particular values are reserved for use in future extensions of ISO/IEC 15938.

## 3.2 Terminology

For the purposes of this document, the following terms and definitions apply. Additional relevant definitions for all sections of this document can be in ISO/IEC 15938-1, ISO/IEC 15938-2, ISO/IEC 15938-3, 15938-4 and ISO/IEC 14496-5 for Systems, DDL, Visual, Audio and MDS definitions, respectively.

### 3.2.1 Schema-related terminology

#### 3.2.2.1

##### Attribute

field of a **description tool** which is of simple type

#### 3.2.2.2

##### Base type

**type** that serves as the root **type** of a derivation hierarchy for other **types**

#### 3.2.2.3

##### Datatype

primitive reusable **type** employed by **Description Schemes** and **Descriptors**

#### 3.2.2.4

##### Derived type

**type** that is defined in terms of extension or restriction of other **types**

#### 3.2.2.5

##### Description

instantiation of one or more **description tools**

#### 3.2.2.6

##### Description Scheme

**description tool** that describes entities or relationships pertaining to **multimedia content**

#### NOTE

**Description Schemes** specify the structure and semantics of their components, which may be **Description Schemes**, **Descriptors**, or **datatypes**.

#### 3.2.2.7

##### Description Tool

**Description Scheme**, **Descriptor**, or **datatype**

#### 3.2.2.8

##### Descriptor

**description tool** that describes a feature, attribute, or group of attributes of multimedia content

#### 3.2.2.9

##### Instantiation

assignment of values to the fields (elements, attributes) of one or more **description tools**

#### 3.2.2.10

##### Element

field of a **description tool** which is of complex type

#### 3.2.2.11

##### Schema

set of related **description tools**, for example, those specified in ISO/IEC 15938

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**3.2.2.12****Type**

format used for collection of letters, digits, and/or symbols, to depict values of an element or attribute of  
**description tool**

NOTE A **type** consists of a set of distinct values, a set of lexical representations, and a set of facets that characterize properties of the value space, individual values, or lexical items.

**3.2.2.13****Canonical XML**

canonical form of an XML document

NOTE If the canonical forms of two XML documents are strictly identical, the two XML documents are considered logically equivalent within the context of this specification. Canonicalization takes into account all syntactic changes physical permitted by XML 1.0 and Namespaces in XML.

**3.2.2.14****XML canonicalization**

method that generates the canonical form of an XML document

NOTE The term XML canonicalization refers to the process of applying the XML canonicalization method to an XML document.

**3.2.2.15****Information set, or info set**

An XML document's information set consisting of a number of information items

NOTE An information item is an abstract description of some part of an XML document: each information item has a set of associated named properties.

**3.2.2.16****Post schema validation info set (PSVI)**

info set which supports information items and properties as defined in XML Schema - Part-1 - annex D

**3.3 Symbols (and abbreviated terms)**

For the purposes of this document, the symbols and abbreviated terms given in the following apply. Additional abbreviations are defined in ISO/IEC 15938 Parts 1-7.

AV	Audio-visual
BiM	Binary format for MPEG-7
CS	Classification Scheme
D	Descriptor
Ds	Descriptors
DCT	Discrete Cosine Transform
DDL	Description Definition Language
DS	Description Scheme
DSs	Description Schemes
IANA	Internet Assigned Numbers Authority

## ISO/IEC 15938-10:2005(E)

IETF	Internet Engineering Task Force
IPMP	Intellectual Property Management and Protection
ISO	International Organization for Standardization
JPEG	Joint Photographic Experts Group
MDS	Multimedia Description Schemes
MPEG	Moving Picture Experts Group
MPEG-2	Generic coding of moving pictures and associated audio information (see ISO/IEC 13818)
MPEG-4	Coding of audio-visual objects (see ISO/IEC 14496)
MPEG-7	Multimedia Content Description Interface Standard (see ISO/IEC 15938)
MP3	MPEG-2 layer 3 audio coding
PSVI	Post schema validation infoset
QCIF	Quarter Common Intermediate Format
SMPTTE	Society of Motion Picture and Television Engineers
TeM	Textual format for MPEG-7
TZ	Time Zone
TZD	Time Zone Difference
URI	Uniform Resource Identifier (see RFC 2396)
URL	Uniform Resource Locator (see RFC 2396)
W3C	World Wide Web Consortium
XML	Extensible Markup Language

## 4 Schema Definition

### 4.1 Introduction

This clause specifies the schema definition across the parts of ISO/IEC 15938. This part collects together the description tools specified in the ISO/IEC 15938, assigns a namespace designator, and specifies the resulting syntax description in a single schema using Description Definition Language [ISO/IEC 15938-2] to specify versions of the schema definition as illustrated in Figure 1. The frequency of creation of versions may depend on a number of factors, including the frequency of creation of amendments to ISO/IEC 15938. Figure 1 is intended to provide an example of how versions are created from the schemas and amendments of the parts of ISO/IEC 15938 and does not determine the exact schedule for creating the versions.

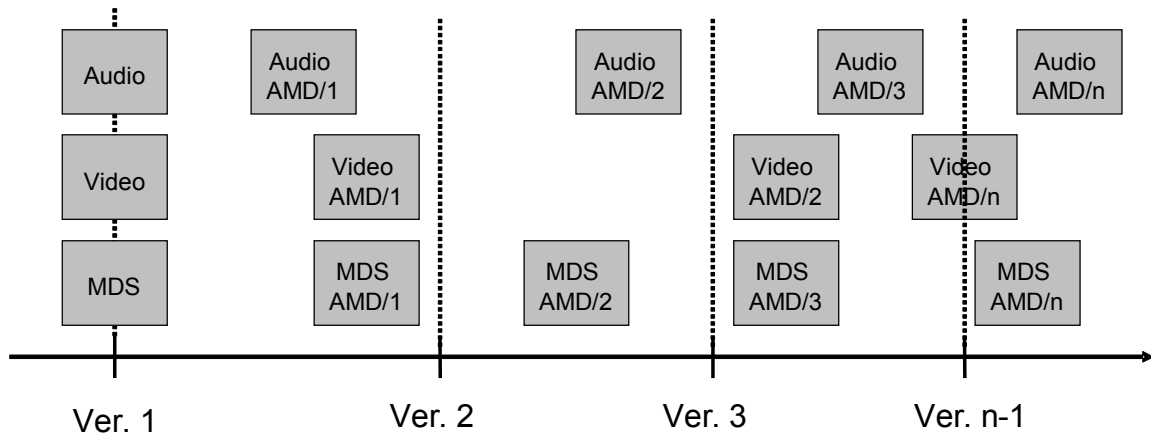


Figure 1 – Specification of versions of schema definition of ISO/IEC 15938.

## 4.2 Version 1 Schema Definition

The following schema definition, referred to as “Version 1” schema, specifies the namespace and syntax of the description tools of:

- ISO/IEC 15938-1 (Systems) + ISO/IEC 15938-1 Systems COR/1
- ISO/IEC 15938-2 (DDL)
- ISO/IEC 15938-3 (Visual) + ISO/IEC 15938-3 Visual COR/1
- ISO/IEC 15938-4 (Audio)
- ISO/IEC 15938-5 (MDS) + ISO/IEC 15938-5 MDS COR/1

Note: the namespace designator “mpeg7” is used in the following schema definition for convenience. Other values may be used as long as the namespace designator value is fixed throughout the schema definition.

```

<!-- ##### -->
<!--           ISO/IEC 15938 Information Technology           -->
<!--           Multimedia Content Description Interface       -->
<!--           MPEG-7 Version 1 Schema                       -->
<!-- ##### -->
<schema targetNamespace="urn:mpeg:mpeg7:schema:2001" elementFormDefault="qualified"
attributeFormDefault="unqualified" xmlns:mpeg7="urn:mpeg:mpeg7:schema:2001"
xmlns="http://www.w3.org/2001/XMLSchema">
  <annotation>
    <documentation>
      The following schema definition corresponds to the description tools of:
      ISO/IEC 15938-1 (Systems) + ISO/IEC 15938-1 Systems COR/1
      ISO/IEC 15938-2 (DDL)
      ISO/IEC 15938-3 (Visual) + ISO/IEC 15938-3 Visual COR/1
      ISO/IEC 15938-4 (Audio)
      ISO/IEC 15938-5 (MDS) + ISO/IEC 15938-5 MDS COR/1
    </documentation>
  </annotation>
<!-- ##### -->
<!-- import xml components -->

```

```

<!-- ##### -->
<import namespace="http://www.w3.org/XML/1998/namespace"
schemaLocation="http://www.w3.org/2001/03/xml.xsd" />
<annotation>
  <documentation>
    This document contains tools defined as MPEG-7 specific extention of
    XML Schema in ISO/IEC 15938-2
  </documentation>
</annotation>
<!-- ##### -->
<!-- ##### ISO/IEC 15938-1 SYSTEMS ##### -->
<!-- ##### -->
<annotation>
  <documentation>
    The following section contains tools defined in ISO/IEC 15938-1
  </documentation>
</annotation>
<!-- ##### -->
<!-- Definition of DecoderInit -->
<!-- ##### -->
<!-- DecoderInitType Systems -->
<complexType name="DecoderInitType">
  <sequence>
    <element name="SchemaReference" type="mpeg7:SchemaReferenceType"
maxOccurs="unbounded"/>
    <element name="InitialDescription" type="mpeg7:AccessUnitType" minOccurs="0"/>
  </sequence>
  <attribute name="systemsProfileLevelIndication" type="decimal" use="required"/>
</complexType>
<complexType name="SchemaReferenceType">
  <attribute name="name" type="anyURI" use="required"/>
  <attribute name="locationHint" type="anyURI" use="optional"/>
</complexType>
<!-- ##### -->
<!-- Definition of AccessUnitType -->
<!-- ##### -->
<complexType name="AccessUnitType">
  <sequence>
    <element name="FragmentUpdateUnit" type="mpeg7:FragmentUpdateUnitType"
maxOccurs="unbounded"/>
  </sequence>
</complexType>
<!-- ##### -->
<!-- Definition of FragmentUpdateUnitType -->
<!-- ##### -->
<complexType name="FragmentUpdateUnitType">
  <sequence>
    <element name="FUCommand" type="mpeg7:FragmentUpdateCommandType"/>
    <element name="FUContext" type="mpeg7:FragmentUpdateContextType" minOccurs="0"/>
    <element name="FUPayload" type="mpeg7:FragmentUpdatePayloadType" minOccurs="0"/>
  </sequence>
</complexType>
<!-- ##### -->
<!-- Definition of FragmentUpdateCommandType -->
<!-- ##### -->
<simpleType name="FragmentUpdateCommandType">
  <union>
    <simpleType>
      <restriction base="string">
        <enumeration value="addNode"/>
      </restriction>
    </simpleType>
  </union>
</simpleType>

```

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```

        <enumeration value="deleteNode"/>
        <enumeration value="replaceNode"/>
        <enumeration value="reset"/>
    </restriction>
</simpleType>
<simpleType>
    <restriction base="string"/>
</simpleType>
</union>
</simpleType>
<!-- ##### -->
<!-- Definition of FragmentUpdateContextType -->
<!-- ##### -->
<!-- FragmentUpdateContextType Systems COR/1 -->
<simpleType name="FragmentUpdateContextType">
    <restriction base="string">
        <pattern
value="/?((\.|(\.|\.))|((\i\c*:)?\i\c*) (\[[d+\]])?) (/((\.)|(\.|\.))|((\i\c*:)?\i\c*) (\[[d+\]])?)*)*/@(\i\c*:)?\i\c*?|@(\i\c*:)?\i\c*"/>
    </restriction>
</simpleType>
<!-- ##### -->
<!-- Definition of FragmentUpdatePayloadType -->
<!-- ##### -->
<!-- FragmentUpdatePayloadType Systems COR/1 -->
<complexType name="FragmentUpdatePayloadType">
    <sequence>
        <any processContents="skip" minOccurs="0"/>
    </sequence>
    <attribute name="hasDeferredNodes" type="boolean" use="optional" default="false"/>
    <anyAttribute namespace="##other" processContents="skip"/>
</complexType>
<!-- ***** -->
<!-- ***** ISO/IEC 15938-2 DDL ***** -->
<!-- ***** -->
<annotation>
    <documentation>
        The following section contains tools defined in ISO/IEC 15938-2
    </documentation>
</annotation>
<!-- ##### -->
<!-- Definition of 'mpeg7:dim" for Matrix Datatype -->
<!-- ##### -->
<!-- definition of listOfPositiveIntegerForDim datatype -->
<simpleType name="listOfPositiveIntegerForDim">
    <list itemType="positiveInteger"/>
</simpleType>
<!-- definition of mpeg7:dim attribute -->
<attribute name="dim">
    <simpleType>
        <restriction base="mpeg7:listOfPositiveIntegerForDim">
            <minLength value="1"/>
        </restriction>
    </simpleType>
</attribute>
<!-- ##### -->
<!-- Definition of MPEG-7 Datatype Extensions -->
<!-- ##### -->
<!-- definition of basicTimePoint datatype -->
<simpleType name="basicTimePointType">

```