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

**Part 7:  
Conformance testing**

*Technologies de l'information — Description de l'interface du contenu  
multimédia —*  
*Partie 7: Essais de conformité*

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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 member bodies casting a vote.

ISO/IEC 15938-7 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of auto, picture, multimedia and hypermedia information*.

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

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— Part 1: Systems

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— Part 2: Description definition language

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— Part 3: Visual

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— 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

## Introduction

ISO/IEC 15938, 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 ISO/IEC 15938:

- **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.

ISO/IEC 15938 is subdivided into eight 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 ISO/IEC 15938.

**Part 7 — Conformance testing:** specifies the guidelines and procedures for testing conformance of implementations of the standard.

**Part 8 — Extraction and Use:** provides guidelines and examples of the extraction and use of descriptions.

This part of ISO/IEC 15938 specifies the conformance part of the ISO/IEC 15938 standard by specifying the guidelines and procedures for testing conformance of implementations of the standard.

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# Information technology — Multimedia content description interface —

## Part 7: Conformance testing

### 1 Scope

#### 1.1 Organization of the document

ISO/IEC 15938 specifies a metadata system for describing multimedia content. This part of ISO/IEC 15938 specifies how tests can be designed to verify whether descriptions and description consuming terminals meet the specifications of parts 1, 2, 3, 4 and 5 of ISO/IEC 15938. In this part of ISO/IEC 15938, the creation or extraction of descriptions from multimedia content is not addressed specifically. A system producing descriptions may be said to be an ISO/IEC 15938 compatible description production system if it produces descriptions (binary or textual) that conform to the specifications of parts 1, 2, 3, 4 and 5 of ISO/IEC 15938.

The characteristics of descriptions and the terminals consuming descriptions are defined for parts 1, 2, 3, 4 and 5 of ISO/IEC 15938 as follows.

- **Descriptions:** the characteristics of a specific description are defined according to syntax and semantics of elements from ISO/IEC 15938 that are used in the description.
- **Terminals:** the characteristics of a terminal consuming a description are defined according to the required description decoding process for the elements used in the description. An example of a description decoding property is the arithmetic accuracy in which the value of element are represented. The capabilities of a description consuming terminal are determined by the domain of descriptions and elements that the terminal is capable of decoding. A description can be decoded by a terminal if the elements of the description are within the subset of ISO/IEC 15938 specified for a given definition of decoder capabilities.

In this document, procedures are described for testing conformance of descriptions and terminals according to the specifications of parts 1, 2, 3, 4 and 5 of ISO/IEC 15938. Given a set of claimed characteristics (descriptions and terminals), the requirements for conformance are fully determined by parts 1, 2, 3, 4 and 5 of ISO/IEC 15938. This part of ISO/IEC 15938 summarizes the requirements and defines how conformance can be tested. Guidelines are given on constructing tests to verify conformance of descriptions and terminals. This document provides additional guidelines on how to construct test suites for checking conformance of terminals. In addition, some test descriptions are provided.

### 2 Normative references

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

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

## ISO/IEC 15938-7:2003(E)

ISO 639 (all parts), *Code for the representation of names of languages*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 3166-2, *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*

NOTE The current list of valid ISO 3166-1 country and ISO 3166-2 region codes is maintained by the official maintenance authority Deutsches Institut für Normung. Information on the current list of valid region and country codes can be found at <http://www.din.de/gremien/nas/nabd/iso3166ma/index.html>.

ISO 4217, *Codes for the representation of currencies and funds*

NOTE The current list of valid ISO 4217 currency codes is maintained by the official maintenance authority British Standards Institution (<http://www.bsi-global.com/iso4217currency>).

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:

<https://standards.iteh.ai/catalog/standards/sist/f225ef39-2f93-4372-b95b->

<http://www.w3.org/TR/2000/REC-xml-20001006>  
*Extensible Markup Language (XML) 1.0 (Second Edition)*, 6 October 2000, 003

*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>.

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

RFC 2045 *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*

RFC 2046 *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*

RFC 2048, *Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures*

RFC 2045-CHARSETS, *Registered Character set codes of RFC2045*

RFC2046-MIMETYPES, *Registered Mimetypes of RFC2046*

NOTE The relevant lists can be obtained as follows:



MIMETYPES. The current list of registered mimetypes, as defined in RFC2046, RFC2048, is maintained by IANA (Internet Assigned Numbers Authority). It is available from <ftp://ftp.isi.edu/in-notes/iana/assignments/media-types/media-types/>

CHARSETS. The current list of registered character set codes, as defined in RFC2045 and RFC2048 is maintained by IANA (Internet Assigned Numbers Authority). It is available from [ftp://ftp.isi.edu/in-notes/iana/assignments/character-sets.](ftp://ftp.isi.edu/in-notes/iana/assignments/character-sets/)

### 3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the following terms, definitions, symbols and abbreviated terms apply.

#### 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.

##### 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:

Name	Definition
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="mpeg7: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

### 3.2.1 General terminology

#### 3.2.1.1

##### **MPEG-7 Terminal**

An entity that consumes an MPEG-7 description and provides it to further processing. An MPEG-7 terminal can be composed of a Systems decoder, a MPEG-7 validating parser or both of them

#### 3.2.1.2

##### **MPEG-7 validating terminal**

An MPEG-7 Terminal which validates MPEG-7 descriptions against their definitions expressed using the DDL and provides them to further processing

#### 3.2.1.3

##### **MPEG-7 systems terminal**

An MPEG-7 Terminal which receives description stream and provides reconstructed description to further processing

### 3.2.2 Schema-related terminology

#### 3.2.2.1

##### **Attribute**

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

#### 3.2.2.2

##### **Base type**

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

#### 3.2.2.3

##### **Datatype**

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

#### 3.2.2.4

##### **Derived type**

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

#### 3.2.2.5

##### **Description**

An instantiation of one or more **description tools**

#### 3.2.2.6

##### **Description Scheme**

A **description tool** that describes 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**

#### 3.2.2.7

##### **Description Tool**

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

#### 3.2.2.8

##### **Descriptor**

A **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**

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

**3.2.2.11**

**Schema**

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

**3.2.2.12**

**Type**

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

A canonical form of an XML document. 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**

A method that generates the canonical form of an XML document. The term XML canonicalization refers to the process of applying the XML canonicalization method to an XML document

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**3.2.2.15**

**Information set, or infoset**

An XML document's information set consists of a number of information items. An information item is an abstract description of some part of an XML document: each information item has a set of associated named properties

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**3.2.2.16**

**Post schema validation infoset (PSVI)**

An infoset which supports information items and properties as defined in XML Schema — Part 1 — Annex D

**3.2.3 Systems-related terminology**

**3.2.3.1**

**Access Unit**

An entity within a description stream that is atomic in time, i.e., to which a composition time can be attached

**3.2.3.2**

**Current description tree**

The description tree that represents the current description in an MPEG-7 Systems decoder

**3.2.3.3**

**Description stream**

The ordered concatenation of either binary or textual access units conveying a single, possibly time-variant, multimedia content description

**3.2.3.4**

**Description tree**

A model of the description handled by MPEG-7 Systems decoder. A description tree consists of nodes, which represent elements or attributes of a description

### 3.3 Symbols and abbreviated terms

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
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 info set
QCIF:	Quarter Common Intermediate Format
SMPTE:	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)