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**Information technology — Multimedia  
framework (MPEG-21) —**

**Part 2:  
Digital Item Declaration**

*Technologies de l'information — Cadre multimédia (MPEG-21) —*

*Partie 2: Déclaration d'article numérique*  
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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.

ISO/IEC 21000-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC 21000-2:2003), which has been technically revised.

ISO/IEC 21000 consists of the following parts, under the general title *Information technology — Multimedia framework (MPEG-21)*:

- *Part 1: Vision, Technologies and Strategy [Technical Report]*
- *Part 2: Digital Item Declaration*
- *Part 3: Digital Item Identification*
- *Part 5: Rights Expression Language*
- *Part 6: Rights Data Dictionary*
- *Part 7: Digital Item Adaptation*
- *Part 8: Reference Software*
- *Part 9: File Format*
- *Part 10: Digital Item Processing*
- *Part 11: Evaluation Tools for Persistent Association Technologies [Technical Report]*
- *Part 12: Test Bed for MPEG-21 Resource Delivery [Technical Report]*
- *Part 15: Event Reporting*
- *Part 16: Binary Format*

The following parts are under preparation:

- *Part 4: Intellectual Property Management and Protection Components*
- *Part 14: Conformance Testing*

## Introduction

Today, many elements exist to build an infrastructure for the delivery and consumption of multimedia content. There is, however, no “big picture” to describe how these elements, either in existence or under development, relate to each other. The aim for MPEG-21 is to describe how these various elements fit together. Where gaps exist, MPEG-21 will recommend which new standards are required. ISO/IEC JTC 1/SC 29/WG 11 (MPEG) will then develop new standards as appropriate while other relevant standards may be developed by other bodies. These specifications will be integrated into the multimedia framework through collaboration between MPEG and these bodies.

The result is an open framework for multimedia delivery and consumption, with both the content creator and content consumer as focal points. This open framework provides content creators and service providers with equal opportunities in the MPEG-21 enabled open market. This will also be to the benefit of the content consumer providing them access to a large variety of content in an interoperable manner.

The vision for MPEG-21 is to define a multimedia framework *to enable transparent and augmented use of multimedia resources across a wide range of networks and devices* used by different communities.

This second part of MPEG-21 (ISO/IEC 21000-2) specifies the mechanism for declaring the structure and makeup of Digital Items.

The International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

The ISO and IEC take no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the ISO and IEC that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with the ISO and IEC. Information may be obtained from the companies listed in Annex A.

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

# Information technology — Multimedia framework (MPEG-21) —

## Part 2: Digital Item Declaration

### 1 Scope

This document describes the ISO/IEC 21000 Digital Item Declaration technology, which is Part 2 of the ISO/IEC 21000 series of International Standards. It specifies:

- the Digital Item Declaration Model (see 6),
- the Digital Item Declaration Representation in XML (see 7), and
- XML schemas comprising grammars for the Digital Item Declaration representation in XML (see 8).

### 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 21000 (all parts), *Information Technology — Multimedia Framework (MPEG-21)*

IETF RFC 2045, *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*, IETF Request for Comments: 2045, November 1996

IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*, IETF Request for Comments: 2616, June 1999

IETF RFC 3548, *The Base16, Base32, and Base64 Data Encodings*, IETF Request for Comments: 3548, July 2003

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*, IETF Request For Comments: 3986, January 2005

W3C XINCLUDE, *XML Inclusions (XInclude) Version 1.0*, W3C Recommendation, 20 December 2004

W3C XML, *Extensible Markup Language 1.0 (Second Edition)*, W3C Recommendation, 6 October 2000

W3C XMLC14N, *Canonical XML Version 1.0*, W3C Recommendation, 15 March 2001

W3C XMLNAMES, *Namespaces in XML*, W3C Recommendation, 14 January 1999

W3C XMLSCHEMA, *XML Schema Part 1: Structures Second Edition* and *XML Schema Part 2: Datatypes Second Edition*, W3C Recommendations, 28 October 2004

### 3 Terms and definitions

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

- 3.1 Abstraction**  
distinct intellectual or artistic creation or concept  
  
[ISO/IEC TR 21000-1:2004]
- 3.2 Asset**  
Manifestation, i.e. physical or digital embodiment of an Expression  
  
[ISO/IEC TR 21000-1:2004]
- 3.3 Digital Item**  
a structured digital object with a standard representation, identification and metadata within the MPEG-21 framework

NOTE This entity is the fundamental unit of distribution and transaction within the MPEG-21 framework as a whole; it has, however, no further technical meaning. Within this document (part 2 of MPEG-21: Digital Item Declaration), an *item* is a grouping of sub-*items* and/or *components* that are bound to relevant *descriptors*, as defined within the Digital Item Declaration Model (see 6). The term *item* is a technical term, and is, as such, a narrower term than Digital Item. In conclusion, the use of the two different terms Digital Item and *item* within MPEG-21 is consistent and intended.

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- 3.4 Expression**  
intellectual or artistic realisation of an Abstraction  
  
[ISO/IEC TR 21000-1:2004] <https://standards.iteh.ai/catalog/standards/sist/82ec93b9-6b97-482b-97c6-2058a1b87c8e/iso-iec-21000-2-2005>

- 3.5 Manifestation**  
the physical or digital embodiment of an Expression  
  
[ISO/IEC TR 21000-1:2004]

### 4 Symbols and abbreviated terms

For the purposes of this document, the following abbreviations apply.

- DID:** Digital Item Declaration
- DIDL:** Digital Item Declaration Language
- EBNF:** Extended Backus-Naur Form
- IANA:** Internet Assigned Numbers Authority
- IETF:** Internet Engineering Task Force
- IPMP:** Intellectual Property Management and Protection
- JPEG:** Joint Photographic Experts Group
- MIME:** Multipurpose Internet Mail Extensions (IETF RFC 2045)



<b>MPEG:</b>	Moving Picture Experts Group
<b>MPEG-21:</b>	ISO/IEC 21000 (all parts)
<b>MPEG-7:</b>	ISO/IEC 15938
<b>MP3:</b>	MPEG-1/2 layer III (audio coding)
<b>RFC:</b>	Request for Comments
<b>SVG:</b>	Scalable Vector Graphics
<b>URI:</b>	Uniform Resource Identifier (IETF RFC 3986)
<b>URL:</b>	Uniform Resource Locator (IETF RFC 3986)
<b>URN:</b>	Uniform Resource Name (IETF RFC 3986)
<b>W3C:</b>	World Wide Web Consortium
<b>XML:</b>	Extensible Markup Language (W3C XML)

## 5 Conventions

### 5.1 Naming convention

It should be noted that the Digital Item Declaration Model (clause 6) contains the concept names that are used throughout the MPEG-21 standard. As such, this model should be considered to be the “ultimate arbiter” of these MPEG-21 concept names.

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### 5.2 Documentation convention

The semantics of each entity in the Digital Item Declaration Model is specified using the constructs provided by EBNF [4], and is shown in this document using a specific font and background:

```
entity ::= (part1 | part2)+ part3*
```

The syntax of each element in the Digital Item Declaration Representation is specified using the constructs provided by XML Schema [2].

Element names and attribute names in the representation are in SMALL CAPS. Throughout the document, *italics* are used when referring to entities defined in the Digital Item Declaration Model (see clause 4), hereafter known as the Model.

The syntax of each element in the Digital Item Declaration representation is specified using the following format.

Table 1 — Example element specification

Diagram			
Children	<CHILD1> <CHILD2> <CHILD3> <CHILD4> <CHILD5>		
Used by	<GRANDPARENT1> <GRANDPARENT2>		
Attributes	Name	Type	Description
	ID	ID	A unique ID value, which can be referenced by another element.
Source	<pre> &lt;xsd:element name="PARENT"&gt;   &lt;xsd:complexType&gt;     &lt;xsd:sequence&gt;       &lt;xsd:element ref="CHILD1" minOccurs="0"/&gt;       &lt;xsd:element ref="CHILD2"/&gt;       &lt;xsd:choice&gt;         &lt;xsd:element ref="CHILD3" minOccurs="0" maxOccurs="unbounded"/&gt;         &lt;xsd:element ref="CHILD4" minOccurs="1" maxOccurs="unbounded"/&gt;       &lt;/xsd:choice&gt;       &lt;xsd:element ref="CHILD5"/&gt;     &lt;/xsd:sequence&gt;     &lt;xsd:attribute name="ID" type="xsd:id"/&gt;   &lt;/xsd:complexType&gt; &lt;/xsd:element&gt; </pre>		

The Language Definition clause contains syntax diagrams for each element. Here is an example syntax diagram with annotations:

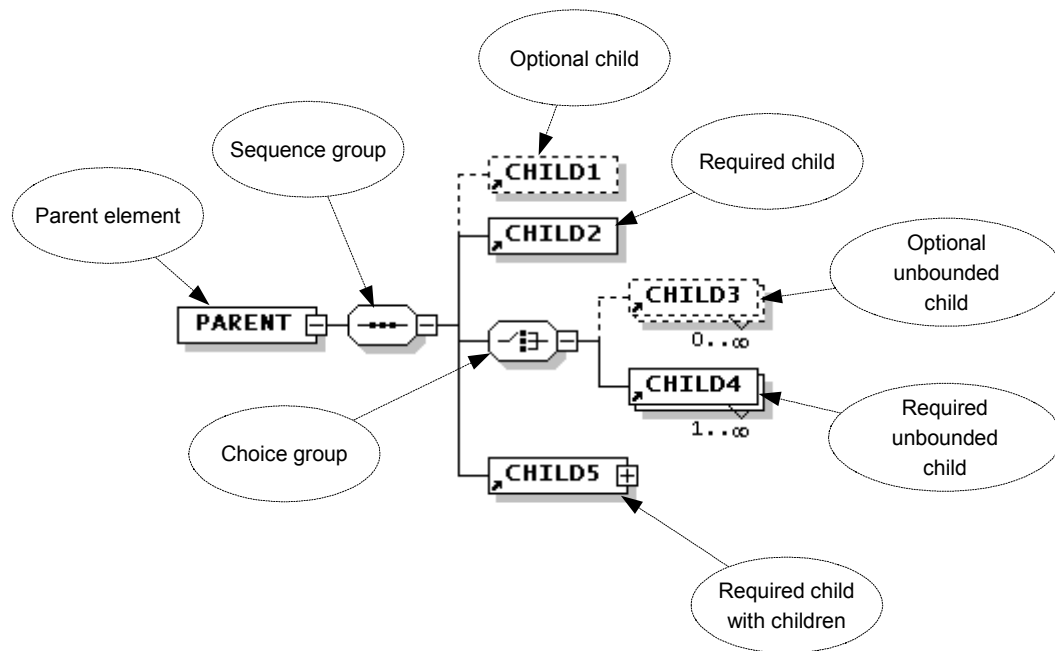


Figure 1 — Example element syntax diagram

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Non-normative examples are included in separate clauses, and are shown in this document using a separate font and background:

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

**5.3 Namespace prefix conventions**

This document makes use of vocabularies from several XML namespaces (where the definition of an XML namespace is as specified in W3C XMLNAMES [7]). Qualified Names are written with a namespace prefix followed by a colon followed by the local part of the Qualified Name as shown in the following example.

EXAMPLE     didl:DIDL

For the purposes of this document the Table below gives the namespace prefixes associated with the identified namespaces.

Table 2 — Namespace prefixes

Namespace prefix	Namespace
didmodel	urn:mpeg:mpeg21:2002:02-DIDMODEL-NS
didl	urn:mpeg:mpeg21:2002:02-DIDL-NS
dii	urn:mpeg:mpeg21:2002:01-DII-NS
mx	urn:mpeg:mpeg21:2003:01-REL-MX-NS
sx	urn:mpeg:mpeg21:2003:01-REL-SX-NS
dia	urn:mpeg:mpeg21:2003:01-DIA-NS
diac	urn:mpeg:mpeg21:2003:01-DIA-DIAC-NS

mpeg7	urn:mpeg:mpeg7:schema:2001
dsig	http://www.w3.org/2000/09/xmlnsig#
rdf	http://www.w3.org/1999/02/22-rdf-syntax-ns#
xml	http://www.w3.org/XML/1998/namespace
xi	http://www.w3.org/2001/XInclude
xsd	http://www.w3.org/2001/XMLSchema
xsi	http://www.w3.org/2001/XMLSchema-instance
dc	http://purl.org/dc/elements/1.1/
uaprof	http://www.wapforum.org/profiles/UAPROF/ccppschem-20000405
foo	This namespace prefix is used for demonstration only.

## 6 Digital Item Declaration Model

### 6.1 Purpose and Overview

The purpose of this clause is to describe a set of abstract terms and concepts to form a useful model for defining Digital Items. Within this model, a Digital Item is the digital representation of an Asset, and as such, it is the unit that is acted upon (managed, described, exchanged, collected, etc.) within the model. The goal of this model is to be as flexible and general as possible, while providing for the “hooks” that enable higher level functionality. This, in turn, allows the model to serve as a key foundation in the building of higher level models in other MPEG-21 elements (such as Identification or IPMP). This model specifically does not define a language in and of itself. Instead, the model helps to provide a common set of abstract concepts and terms that can be used to define such a scheme, or to perform mappings between existing schemes capable of Digital Item Declaration, for comparison purposes.

### 6.2 Abstract Model

#### 6.2.1 Entity Descriptions

In the following descriptions, the defined entities in *italics* are intended to be unambiguous terms within this model. The prose descriptions define the semantic “meaning” of the terms, and the EBNF representations define the precise intended relationship or structure between terms within the model.

#### 6.2.2 container

A *container* is a structure that allows *items* and/or *containers* to be grouped. These groupings of *items* and/or *containers* can be used to form logical packages (for transport or exchange) or logical shelves (for organization). *Descriptors* allow for the “labelling” of *containers* with information that is appropriate for the purpose of the grouping (e.g. delivery instructions for a package, or category information for a shelf).

It should be noted that a *container* itself is not an *item*; *containers* are groupings of *items* and/or *containers*.

```
container ::= descriptor* container* item*
```

#### 6.2.3 item

An *item* is a grouping of sub-*items* and/or *components* that are bound to relevant *descriptors*. *Descriptors* contain information about the *item*, as a representation of an Asset. *Items* may contain *choices*, which allow them to be customized or configured. *Items* may be conditional (on *predicates* asserted by *selections* defined

in the *choices*). An *item* that contains no sub-*items* can be considered a whole -- a logically indivisible Asset. An *item* that does contain sub-*items* can be considered a compilation -- an Asset composed of potentially independent sub-parts. *items* may also contain *annotations* to their sub-parts.

The relationship between *items* and Digital Items (as defined in ISO/IEC 21000-1:2001, MPEG-21 Vision, Technologies and Strategy) could be stated as follows: *items* are declarative representations of Digital Items.

```
item ::= condition* descriptor* choice* (item | component)* annotation*
```

#### 6.2.4 component

A *component* is the binding of a *resource* to a set of *descriptors*. These *descriptors* are information concerning all or part of the specific *resource* instance. Such *descriptors* will typically contain control or structural information about the *resource* (such as bit rate, character set, start points or encryption information) but not information describing the “content” within.

It should be noted that a *component* itself is not an *item*; *components* are building blocks of *items*.

```
component ::= condition* descriptor* resource anchor*
```

#### 6.2.5 anchor

An *anchor* binds *descriptors* to a *fragment*, which corresponds to a specific location or part of a *resource*. These *descriptors* are information concerning all or part of the *fragment*.

```
anchor ::= condition* descriptor* fragment
```

#### 6.2.6 descriptor

A *descriptor* associates information with the enclosing entity. This information may be a *component* (such as a thumbnail of an image, or a text *component*), or a textual *statement*.

NOTE Though a *descriptor* associates information with the enclosing entity, that information does not always directly concern the enclosing entity. The enclosing entity specifies what the associated information concerns. (For example, a *descriptor* in a *component*, associates information with a *component* that concerns the *resource* in that *component*.)

```
descriptor ::= condition* descriptor* (component | statement)
```

#### 6.2.7 condition

A *condition* describes the enclosing entity as being optional, and links it to the *selection(s)* that affect its inclusion. Multiple *predicates* within a *condition* are combined as a conjunction (an AND relationship). Any *predicate* may be negated within a *condition*. Multiple *conditions* associated with a given entity are combined as a disjunction (an OR relationship) when determining whether to include the entity.

```
condition ::= predicate+
```

### 6.2.8 choice

A *choice* describes a set of related *selections* that can affect the configuration of an *item*. The *selections* within a *choice* are either exclusive (choose exactly one) or inclusive (choose any number, including all or none).

```
choice ::= condition* descriptor* selection+
```

### 6.2.9 selection

A *selection* describes a specific decision that will affect one or more *conditions* somewhere within an *item*. If the *selection* is chosen, its *predicate* becomes true; if it is not chosen, its *predicate* becomes false; if it is left unresolved, its *predicate* is undecided.

```
selection ::= condition* descriptor* predicate
```

### 6.2.10 annotation

An *annotation* describes a set of information about another identified entity of the model without altering or adding to that entity. The information can take the form of *assertions*, *descriptors*, and *anchors*.

```
annotation ::= assertion* descriptor* anchor*
```

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### 6.2.11 assertion

An *assertion* defines a full or partially configured state of a *choice* by asserting true, false or undecided values for some number of *predicates* associated with the *selections* for that *choice*.

ISO/IEC 21000-2:2005

```
assertion ::= predicate*
```

### 6.2.12 resource

A *resource* is an individually identifiable Asset such as a video or audio clip, an image, or a textual Asset. A *resource* may also potentially be a physical object. All *resources* shall be locatable via an unambiguous address.

### 6.2.13 fragment

A *fragment* unambiguously designates a specific point or range within a *resource*. *Fragment* may be *resource* type specific.

### 6.2.14 statement

A *statement* is a literal textual value that contains information, but not an Asset. Examples of likely *statements* include descriptive, control, revision tracking or identifying information (such as an identifier as described in ISO/IEC 21000-3).

### 6.2.15 predicate

A *predicate* is an unambiguously identifiable declaration that can be true, false or undecided.

The following diagram is an example showing the most important entities within this model, how they are related, and as such, the hierarchical structure of the Digital Item Declaration Model.

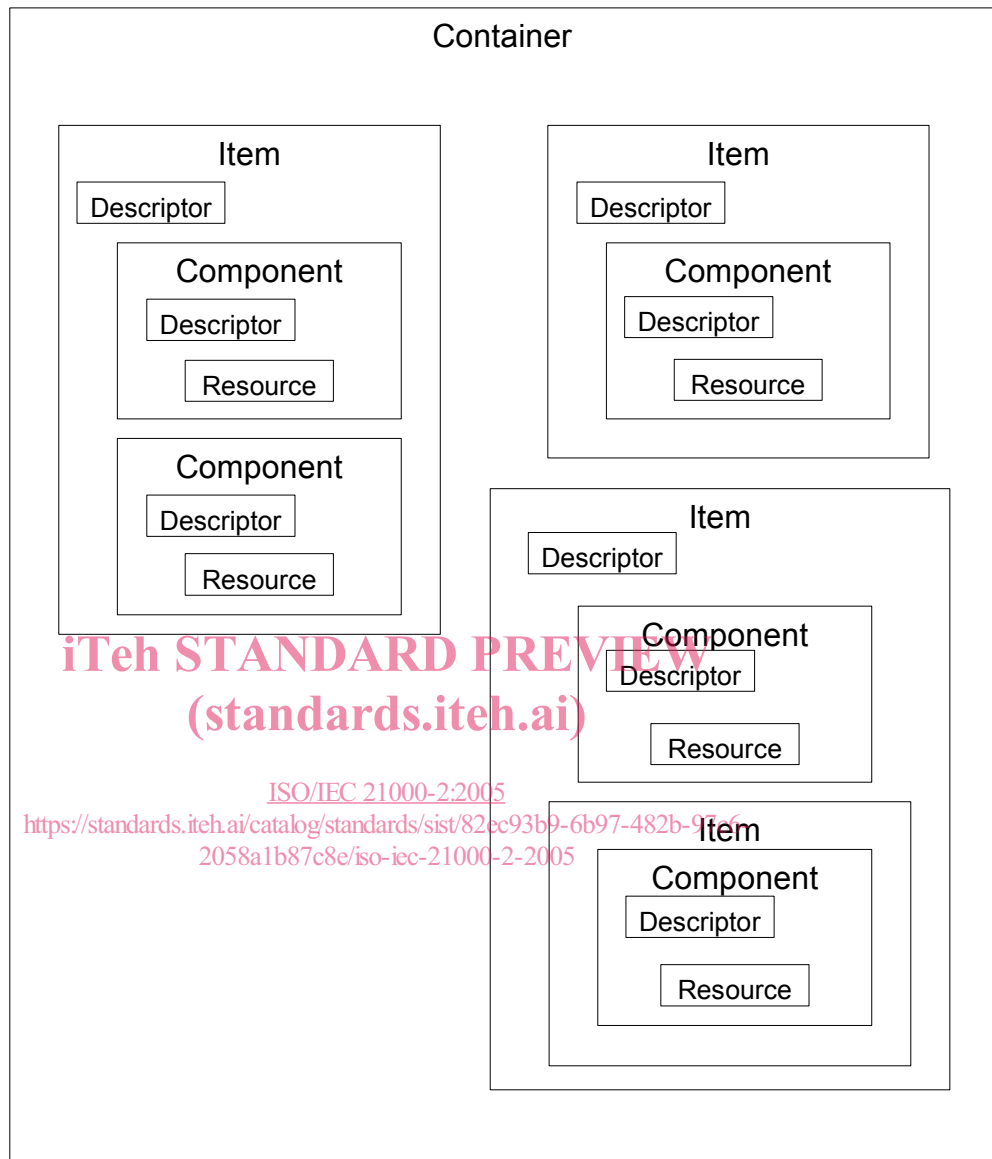


Figure 2 — Example Digital Item Declaration model