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Information technology — Multimedia framework (MPEG-21) —

Part 3:
Digital Item Identification

Technologies de l'information — Cadre multimédia (MPEG-21) —
Partie 3: Identification des éléments digitaux

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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 21000-3 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 21000 consists of the following parts, under the general title *Information technology — Multimedia framework (MPEG-21)*:

— *Part 1: Vision, Technologies and Strategy*

— *Part 2: Digital Item Declaration*

— *Part 3: Digital Item Identification*

— *Part 4: Intellectual Property Management and Protection*

— *Part 5: Rights Expression Language*

— *Part 6: Rights Data Dictionary*

— *Part 7: Digital Item Adaptation*

— *Part 8: Reference Software*

— *Part 9: File Format*

NOTE   Other parts may be added in the future.

Executive Summary for MPEG-21

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 third part of MPEG-21 (ISO/IEC 21000-3) specifies how Digital Items (see ISO/IEC 21000-2) and parts and collections thereof can be uniquely identified.

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Information technology — Multimedia framework (MPEG-21) —

Part 3:
Digital Item Identification

1   Scope

This third part of MPEG-21 (ISO/IEC 21000-3), entitled Digital Item Identification (DII), specifies

— How to uniquely identify Digital Items (and parts thereof);

— How to uniquely identify IP related to the Digital Items (and parts thereof), for example abstractions;

— How to uniquely identify Description Schemes;

— The relationship between Digital Items (and parts thereof) and existing identification systems. Annex C contains a list of relevant identification systems. This is not an exhaustive list and is subject to change over time;

— The relationship between Digital Items (and parts thereof) and relevant description schemes. Annex C contains a list of relevant description schemes. This is not an exhaustive list and is subject to change over time.

ISO/IEC 21000-3 specification does not specify:

— New identification systems for the content elements for which identification and description schemes already exist and are in use (e.g., ISO/IEC 21000-3 does not attempt to replace the ISRC, as defined in ISO 3901, for sound recordings;

— Normative description schemes for describing content.

1.1   Organisation of the Document

This specification contains five Clauses and four Annexes:

The remainder of this Clause 1 contains an overview of MPEG-21 Digital Items and the relation between parts 2 and 3 of ISO/IEC 21000. Clauses 2 and 3 contain normative references and a list of applicable terms and definitions.

Clause 4 specifies how to uniquely identify Digital Items, how to associate related identifiers with Digital Items, how to identify different types of Digital Items. Clause 0 then specifies how to associate metadata with Digital Items by using description scheme identifiers.

The normative Annex A contains criteria that need to be fulfilled by a registration authority that is required for the identification of Digital Items and their parts as specified in ISO/IEC 21000-3. Annex B contains an informative example of how to resolve a unique identifier to appropriate metadata. Annex C contains an informative list of existing identification schemes that can be used by this specification. Finally, Annex D contains information of patent statements relating to this specification.

1

1.2   Introduction to Digital Items

Within any system (such as MPEG-21) that proposes to facilitate a wide range of actions involving "Digital Items", there is a need for a very precise description for defining exactly what constitutes such an "item". Clearly there are many kinds of content, and probably just as many possible ways of describing it to reflect its context of use. This presents a strong challenge to lay out a powerful and flexible model for Digital Items which can accommodate the myriad forms that content can take (and the new forms it will assume in the future). Such a model is only truly useful if it yields a format that can be used to represent any Digital Items defined within the model unambiguously and communicate them, and information about them, successfully.

The Digital Item Declaration specification (ISO/IEC 21000-2) provides such flexibility for representing Digital Items.

1.3   Example of a Digital Item

This sub-clause provides a simple example of a Digital Item. More complex examples can be found in ISO/IEC 21000-2.

This example uses ISO/IEC 21000 to create an "MPEG-21 Music Album" comprising a series of resources:

— Three audio files (coded in MPEG-2 AAC[1]), representing the "tracks" that form the basis of the album;

— Two text files (in Unicode[2]), representing the lyrics to two of the tracks;

— Two images (in JPEG[3]), representing the cover photograph and other artwork of the album;

— A text file (in HTML[4]), representing the introductory text for the album.

The relationship between these resources and how they relate to the Digital Item itself is expressed in the Digital Item Declaration (DID[5]). The DID contains, besides the references to the resources, information *about* the item and/or parts thereof. These metadata elements are associated through DID mechanisms to the item/resources as shown in Figure 1 overleaf.

1.4   Relationship between Digital Item Declaration and Digital Item Identification

Identifiers covered by this specification can be associated with Digital Items, containers, components, and/or fragments thereof by including them in a specific place in the Digital Item Declaration. This place is the STATEMENT element. Examples of likely STATEMENTs include descriptive, control, revision tracking and/or identifying information.

Figure 2 overleaf shows this relationship. The shaded boxes are subject of this specification while the bold boxes are defined in ISO/IEC 21000-2.

Several elements within a Digital Item Declaration can have zero, one or more DESCRIPTORs (as specified in ISO/IEC 21000-2). Each DESCRIPTOR may contain one STATEMENT which can contain one identifier relating to the parent element of the STATEMENT. In Figure 2, the two statements shown are used to identify a Component (left hand side of the diagram) and an Item (right hand side of the diagram).

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1)   As specified in ISO/IEC 13818-3.

2)   As specified in ISO 10646.

3)   As specified in ISO/IEC 10918.

4)   As specified in W3C's HTML 4.0 Specification.
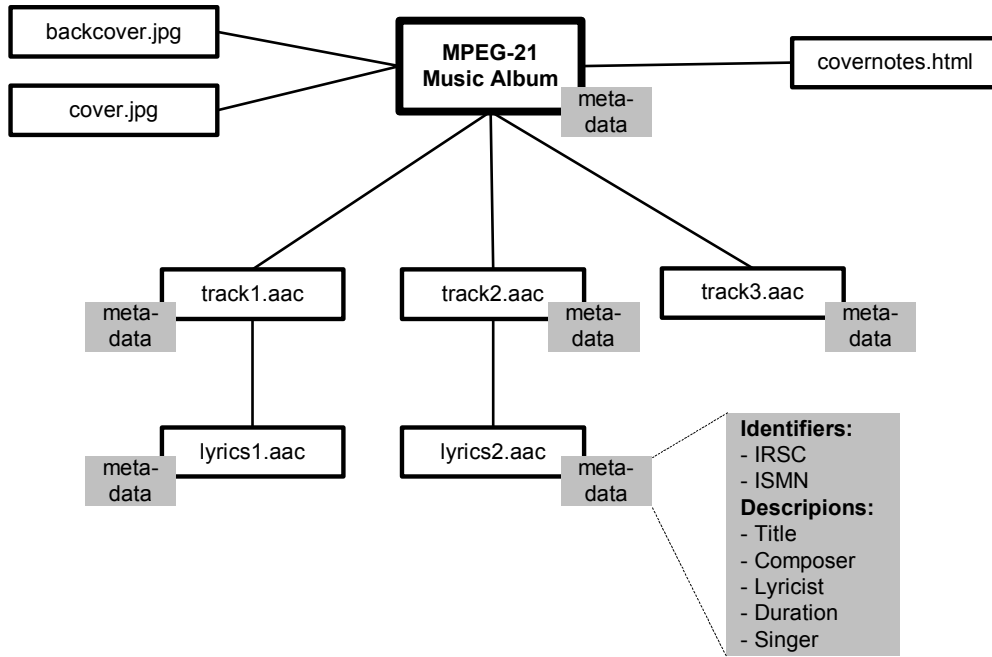
5)   As specified in ISO/IEC 21000-2.

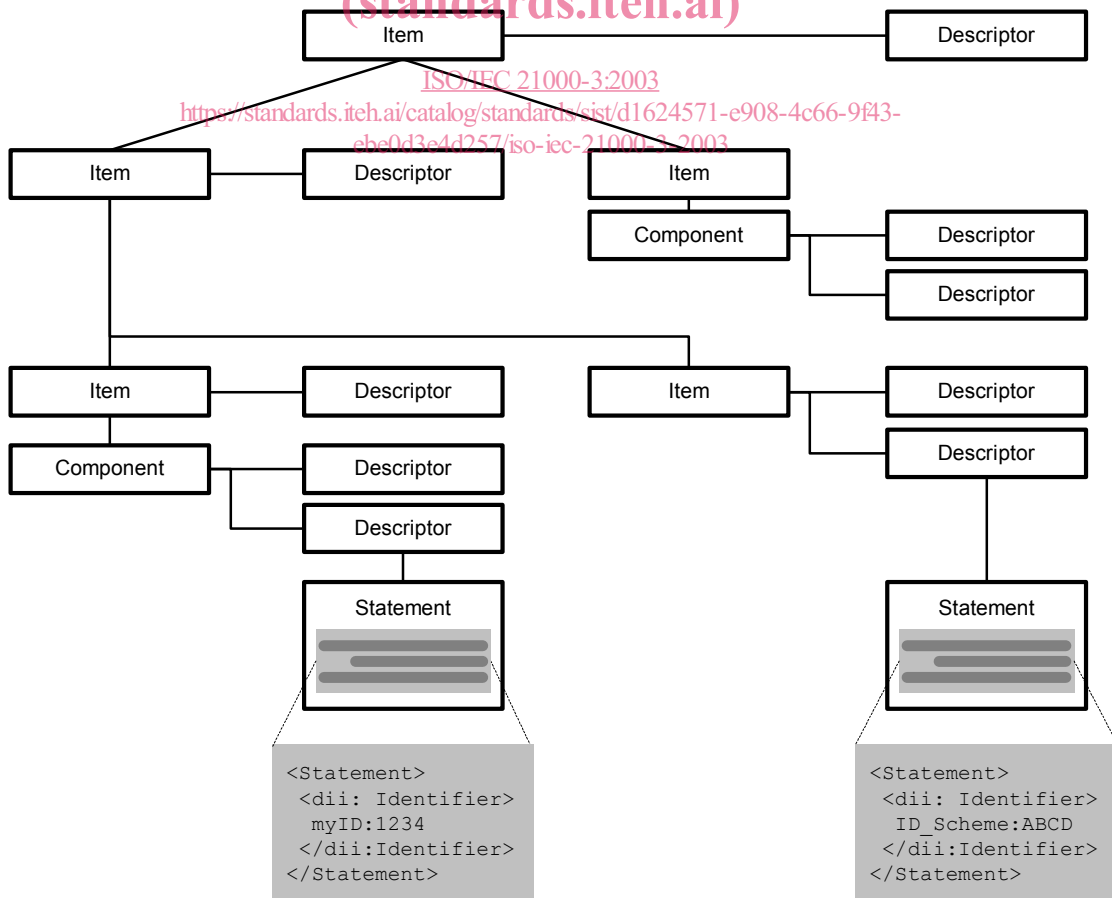**Figure 1 — MPEG-21 Music Album**

Figure 2 — Relationship between Digital Item Declaration and Digital Item Identification

Figure 3 below gives an example of a DID Descriptor containing one identifier. Please note the use of the DII Schema (identified by the DII namespace) as defined in Clause 4.4.

```
<?xml version="1.0"?>
<DIDL xmlns="urn:mpeg:mpeg21:2002:01-DIDL-NS"
      xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS">

  <Item id="Track1">
    <!-- Unique identifier of this digital item -->
    <Descriptor id="Item_Identifier">
      <Statement mimeType="text/xml">
         <dii:Identifier>urn:mpegRA:mpeg21:dii:cid:1702.F109%2F0000011</dii:Identifier>
      </Statement>
    </Descriptor>
  <!-- more information -->
  </Item>
</DIDL>
```

Figure 3 — Example: Uniquely Identifying a Digital Item

1.5 Using Identifiers to Link Identifiers with Associated Information

Users may link Identifiers to related entities (e.g. related metadata, related Digital Items and parts thereof, etc). One mechanism for achieving this is by using an online Resolution service such as the Domain Name System (DNS) Resolution system[6].

While some of the identification systems that are used to uniquely identify "content" have the capabilities to resolve an identifier on-line to appropriate metadata (e.g. cIDf, DOI), others do not have this capability (e.g. ISBN, ISRC). The latter identification systems still enable Users to link the identifier to appropriate metadata off line. ISO/IEC 21000-2 does not mandate or specify such linking mechanism. Annex A provides an example of how such linking can be done on line.

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/IEC TR 21000-1:2001, *Information technology — Multimedia framework (MPEG-21) — Part 1: Vision, Technologies and Strategy*

ISO/IEC 21000-2:2002, *Information technology — Multimedia framework (MPEG-21) — Part 2: Digital Item Declaration*

IETF RFC 2396, *Uniform Resource Identifiers (URI): Generic Syntax,* 1988

IETF RFC 2141, *URN Syntax,* 1997

IETF RFC 1738, *Uniform Resource Locators (URL),* 1994

W3C XML Schema — Part 1: Structures, 2001

W3C XML Schema — Part 2: Datatypes, 2001

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6) As specified in IETF's RFC 1738.

3   Terms and definitions

3.1   Terms and definitions

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

3.1.1
Component
A component is the binding of a resource to a set of descriptors. These descriptors are information related to 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. (From ISO/IEC 21000-2)

3.1.2
Descriptor
A descriptor associates information with the enclosing element. This information may be a component (such as a thumbnail of an image, or a text component), or a textual statement. (From ISO/IEC 21000-2)

3.1.3
Digital item
Structured digital objects, including a standard representation and identification, and meta-data. This entity is the fundamental unit of distribution and transaction within the MPEG-21 framework as a whole. (From ISO/IEC 21000-1)

3.1.4
Electronic Media
A means of representing a digital Media Resource in a given media format for electronic distribution.

3.1.5
Entity
Anything that can be uniquely identified (e.g. digital Resources, individuals and organisations, transactions, etc).

3.1.6
Identification Scheme
A system for associating Identifiers with Entities (both as defined herein), e.g. ISRC, ISBN, etc.

3.1.7
Identifier
A unique label (a string whose function is to distinguish one entity from another) allocated to an entity within a given namespace, e.g. "ISRC GB-XYZ-01-00001", i.e., the label associated with a specific entity.

3.1.8
Item
An item is a grouping of sub-items and/or components that are bound to relevant descriptors, as defined within ISO/IEC 21000-2. The term item is a technical term, and is, as such, a narrower term than Digital Item.

3.1.9
Media Resource
Content directly capable of digital representation.

3.1.10
Physical Media
A means of representing either an analogue or a digital Media Resource in a given media format for physical distribution.

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3.1.11
Resolution

The act of submitting an identifier to a network service and receiving in return one or more pieces of some information (which includes resources, descriptions, another identifier, Digital Item, etc.) related to the identifier.

3.1.12
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 must be locatable via an unambiguous address. (From ISO/IEC 21000-2)

3.1.13
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 any other normative part of ISO/IEC 21000). (From ISO/IEC 21000-2)

3.2 Abbreviations

For the purposes of this part of ISO/IEC 21000, the following abbreviations apply.

cIDf
Content ID Forum

CIS
Common Information System

CISAC
Confédération Internationale des Sociétés d'Auteurs et Compositeurs (International Confederation of Societies of Authors and Composers)

DCMI
Dublin Core Metadata Initiative

DID
Digital Item Declaration

DII
Digital Item Identification

DOI
Digital Object Identifier

EAN
European Article Number

IEC
International Electrotechnical Commission

ISAN
International Standard Audiovisual Number

ISBN
International Standard Book Number

ISO
International Organization for Standardization