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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

Reference number
ISO/IEC 21000-3:2003(E)

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Contents

Page

Foreword v

Executive Summary for MPEG-21 vi

1 Scope 1
1.1 Organisation of the Document 1
1.2 Introduction to Digital Items 2
1.3 Example of a Digital Item 2
1.4 Relationship between Digital Item Declaration and Digital Item Identification 2
1.5 Using Identifiers to Link Identifiers with Associated Information 4

2 Normative references 4

3 Terms and definitions 5
3.1 Terms and definitions 5
3.2 Abbreviations 6

4 Identification of Digital Items and their Parts 7
4.1 `Identifier` Element 7
4.1.1 Syntax 7
4.1.2 Semantics 8
4.1.3 Notes (informative) 8
4.2 `RelatedIdentifier` Element 8
4.2.1 Syntax 8
4.2.2 Semantics 8
4.2.3 Example 9
4.3 `Type` Element 9
4.3.1 Syntax 9
4.3.2 Semantics 9
4.3.3 Example 9
4.4 Digital Item Identification XML Schema Definition 9
4.5 Examples (informative) 10
4.5.1 Example: Identification of a Music Release 10
4.5.2 Example: Referring to Digital Item in external DID Document 10
4.5.3 Example: Referring to Resources stored on external server 12
4.5.4 Example: Identifying a Sound Recording and the related Underlying Musical Work 12
4.5.5 Example: Identifying a Digital Item Type 13

5 Identification of Description Schemes 13

Annex A (normative) **Requirements for the Registration Authority for Digital Item Identification Systems** 14
A.1 Identifications Systems to be registered for use within ISO/IEC 21000 14
A.2 Procedure for Requesting an Identification System Identifier for use within ISO/IEC 21000 14
A.3 Responsibilities of the Registration Authority 14
A.4 Contact information for the Registration Authority 15
A.5 Responsibilities of Parties Requesting a Identification System within ISO/IEC 21000 15
A.6 Appeal Procedure for Denied Applications 15
A.7 Registration Application Form 16

Annex B (informative) **Interoperability Considerations on Resolution Systems** 17
B.1 Introduction 17
B.2 Necessary Functions and Resolution System Switcher 17
B.3 An Overall Example of a DID Browsing System with Resolution System Switcher 19
B.4 Summary 19

Annex C (informative) **List of existing Identification and Description Schemes** 20

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C.1 Common Information System – CIS **20**
C.2 Content ID Forum – cIDf **20**
C.3 Digital Object Identifier – DOI **21**
C.4 Dublin Core Metadata Initiative – DCMI **22**
C.5 The EAN/UCC System **22**
C.6 Global Release Identifier – GRID **22**
C.7 Identifier for Versions of Audiovisual works – V-ISAN **23**
C.8 International Standard Audiovisual Number – ISAN **23**
C.9 International Standard Book Number – ISBN **23**
C.10 International Standard Recording Code – ISRC **24**
C.11 International Standard Serial Number – ISSN **24**
C.12 International Standard Textual Work Code – ISTC **25**
C.13 International Standard Work Code – ISWC **25**
C.14 INteroperability of Data in E-Commerce Systems – INDECS **26**
C.15 ONline Information eXchange – ONIX International **26**
C.16 URL-based Identification Schemes **27**

Annex D (informative) **Patent statements** **29**

Bibliography **30**

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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.

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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.

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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).

---

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.

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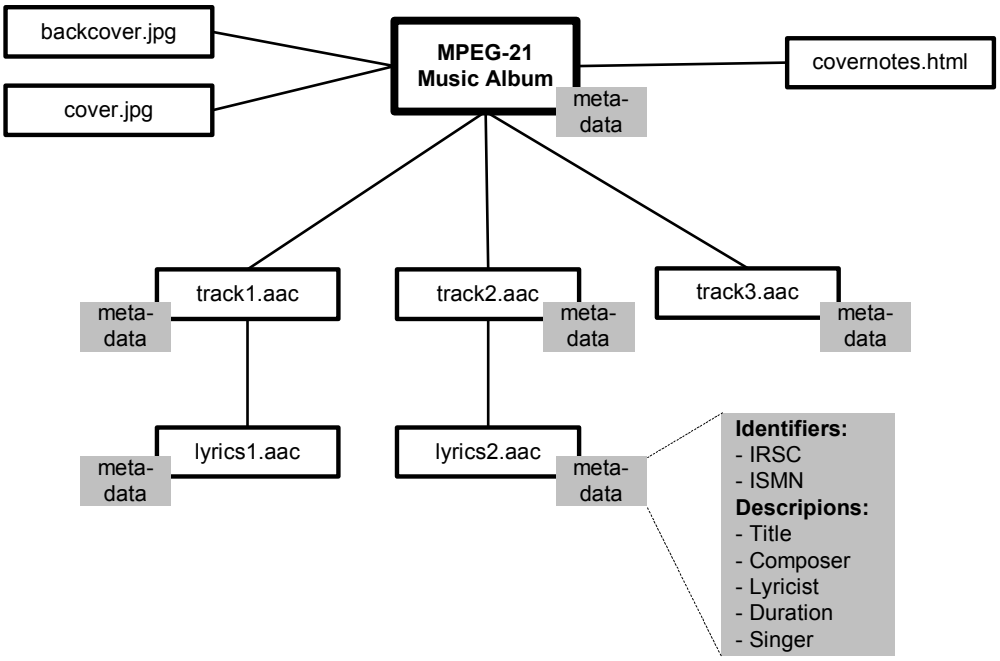

Figure 1 — MPEG-21 Music Album

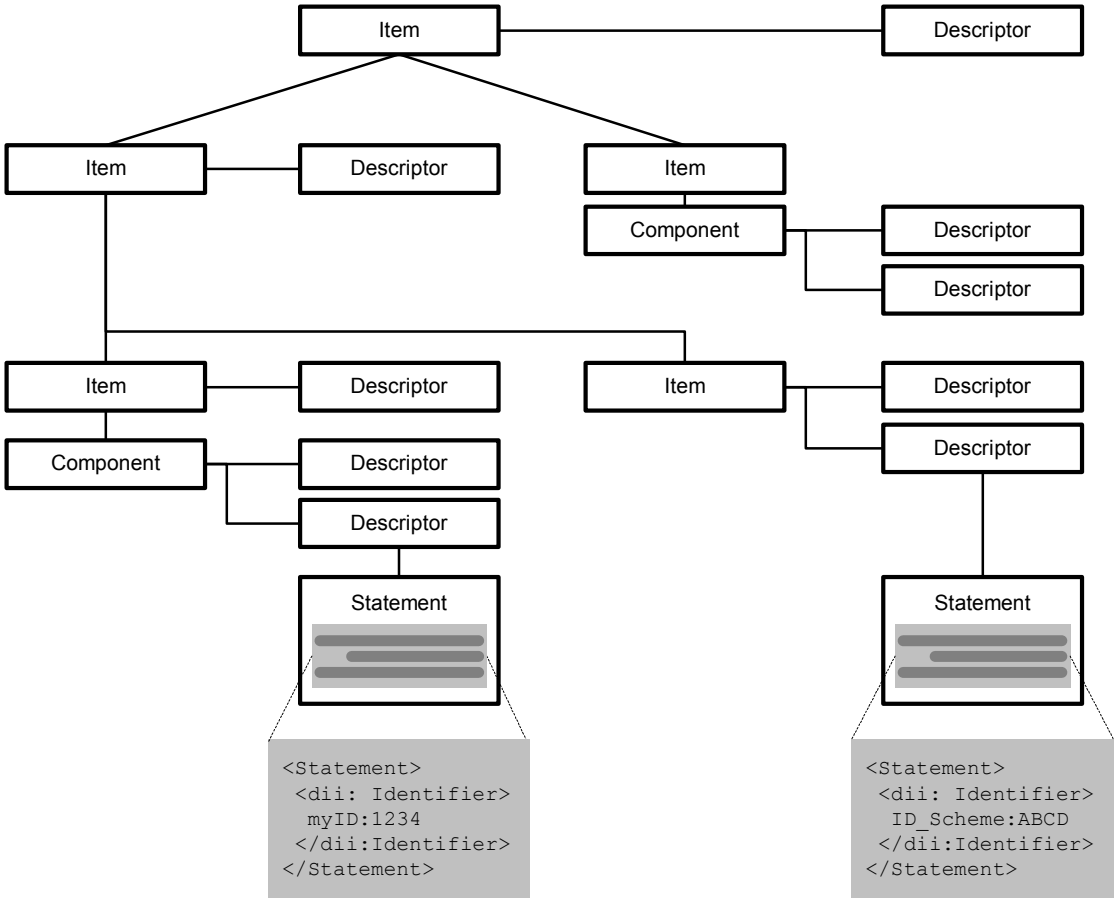

Figure 2 — Relationship between Digital Item Declaration and Digital Item Identification

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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

6) As specified in IETF's RFC 1738.

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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

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ISRC
International Standard Recording Code

ISSN
International Standard Serial Number

ISTC
International Standard Textual Work Code

ISWC
International Standard Musical Work Code

MPEG
Moving Picture Expert Group

SMPTE
Society of Motion Picture and Television Engineers

UCC
Uniform Code Council

UPC
Universal Product Code

URI
Uniform Resource Identifier

URL
Uniform Resource Locator

URN
Uniform Resource Name

V-ISAN
Version Identifier for ISAN

4 Identification of Digital Items and their Parts

4.1 `Identifier` Element

Digital Items and their parts within the MPEG-21 Multimedia Framework are identified by encapsulating Uniform Resource Identifiers (URIs)[7] into the `Identifier` element.

4.1.1 Syntax

```
<--! ##############################
      ISO/IEC 21000-3 DI Identification Element
     ##############################>
<xsd:element name="Identifier" type="xsd:anyURI"/>
```

7) As specified in IETF's RFC 2396.

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4.1.2 Semantics

This element contains an identifier for a Digital Item, container, component, and/or fragment thereof in the form of a URI.

A Registration Authority is set up for maintaining a list of identification schemes to be used within ISO/IEC 21000-3. Requirements for the Registration Authority can be found in Annex A.

Identifiers are not required to be registered with the Registration Authority to be conformant to Clause 4.1 of this specification.

4.1.3 Notes (informative)

A Uniform Resource Identifier (URI) is a compact string of characters for identifying an abstract or physical resource, where a resource is defined as “anything that has identity”.

The requirement that a Digital Item Identifier be a URI is also consistent with the statement that the MPEG-21 identifier may be a Uniform Resource Locator (URL), since the specification of URI is designed to meet the recommendations laid out in URL specification[8)]. The term URL refers to a specific subset of URI that is in use today as pointers to information on the Internet; it allows for long-term to short-term persistence depending on the business case.

4.2 `RelatedIdentifier` Element

While the Digital Item `Identifier` element is intended to enable the unique identification of Digital Items (or parts thereof), the `RelatedIdentifier` element allows the identification information that is related to the Digital Item (or parts thereof).

One example for this is the identification of an abstraction of the work (e.g. a composition as an abstraction of a sound recording).

4.2.1 Syntax

```
<--! ################################
     ISO/IEC 21000-3 DI Related Identifier Element
     ################################>

<xsd:element name="RelatedIdentifier" type="xsd:anyURI"/>
```

4.2.2 Semantics

This element allows associating identifiers that are related to the Digital Item, container, component, and/or fragment thereof but do not identify the Digital Item (or part thereof) directly. The identifier shall be in the form of a URI.

The `RelatedIdentifier` element may not be used for identifying the Digital Item (or part thereof) itself. This shall be done using the Digital Item `Identifier` element as specified above.

A Registration Authority is set up for maintaining a list of identification schemes to be used within ISO/IEC 21000-3. Requirements for the Registration Authority can be found in Annex A.

Identifiers are not required to be registered with the Registration Authority to be conformant to Clause 4.2 of this specification.

8) As specified in IETF's RFC 1738.

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4.2.3 Example

See Figure 7 for a specific example for the `RelatedIdentifier` element.

4.3 `Type` Element

4.3.1 Syntax

```
<--! ################################
   ISO/IEC 21000-3 Type Element
   ################################>

<xsd:element name="Type" type="xsd:anyURI"/>
```

The `Type` element shall only appear as the sole child element of a `Statement` that shall appear as a child element of a `Descriptor` that shall appear as a child element of an `Item`.

4.3.2 Semantics

The `Type` element will allow subsequent parts of ISO/IEC 21000 to identify special types of Digital Items.

4.3.3 Example

See Figure 8 or a specific example for the `Type` element.

4.4 Digital Item Identification XML Schema Definition

This clause defines the schema definition for ISO/IEC 21000-3.

```
<?xml version="1.0"?>
<!--============================================================-->
<!--                                                            -->
<!--             XML Schema for ISO/IEC 21000-3                 -->
<!--                                                            -->
<!--============================================================-->

<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
            xmlns="urn:mpeg:mpeg21:2002:01-DII-NS"
            targetNamespace="urn:mpeg:mpeg21:2002:01-DII-NS"
            version="0.01">

<!--============================================================-->

<!-- Identifier element – as defined in Clause 4.1 of ISO/IEC 21000-3 -->
  <xsd:element name="Identifier" type="xsd:anyURI"/>

<!-- Related Identifier element – as defined in Clause 4.2 of ISO/IEC 21000-3 -->
  <xsd:element name="RelatedIdentifier" type="xsd:anyURI"/>

<!-- Type element – as defined in Clause 4.3 of ISO/IEC 21000-3 -->
  <xsd:element name="Type" type="xsd:anyURI"/>

</xsd:schema>
```

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ISO/IEC 21000-3 used its own namespace `urn:mpeg:mpeg21:2002:01-DII-NS`. The “01” represents a serial number that is expected to change as the schema evolves along with the rest of ISO/IEC 21000. The "2002" in the namespace identifier is not expected to change when subsequent versions of the ISO/IEC 21000-2 schema are developed.

4.5 Examples (informative)

The following examples show how to use the `Identifier`, `RelatedIdentifier` and `Type` elements to identify Digital Items and parts thereof, how to associate related identifiers with Digital Items and how to identify special Digital Item types.

The second and the third examples also illustrate how to use such identifiers to reference Resources.

4.5.1 Example: Identification of a Music Release

This example shows how to use the `Identifier` element to uniquely identify a Digital Item containing a music release. The identifier used stems from a proprietary identification scheme using the namespace `myID`. Please note that `myID` is *not* a registered URN namespace.

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

   <Item>

       <Descriptor>
           <Statement mimeType="text/text">Impossible Super Singles 2001</Statement>
       </Descriptor>

       <!-- This is the top level release descriptor that describes this whole box set -->

       <Descriptor>
           <Statement mimeType ="text/xml">
               <dii:Identifier>myID:A1-888999-0029733-22-F</dii:Identifier>
           </Statement>
       </Descriptor>

       <Descriptor>
           <Statement mimeType ="text/xml">
               <release:title>
                   <release:disp title LANG CODE="EN">Super Singles '01</release:disp title>
                   <release:orig title LANG CODE="EN">Super Singles 2001</release:orig title>
               </release:title>
           </Statement>
       </Descriptor>
   </Item>
</DIDL>
```

Figure 4 — Example: Identification of a Musical Release

4.5.2 Example: Referring to Digital Item in external DID Document

Digital Item Identifiers can be used to refer to Digital Item, container, component, fragment thereof, or DID documents that are externally defined. This is an example to show how Digital Item Identifiers can be used for these purposes. In this example, it is assumed that the Registration Authority for Digital Item Identification Systems described in Annex A uses the form `urn:mpegRA:mpeg21:dii:`*`sss`*`:`*`nnn`*, where the string *`sss`* denotes the Identifier for an Identification System and *`nnn`* denotes a unique identifier within that Identification System.

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```
- - - - - - - - - - - - - -.-
(File a) Main DID document including references to an external Digital Item and an external DID
documdent.
- - - - - - - - - - - - - -.-
<?xml version="1.0"?>
<DIDL xmlns="urn:mpeg:mpeg21:2002:01-DIDL-NS"
      xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS">

  <Item id="TRACK_01">
    <!-- Tracks of this album -->
    <Item>
      <Descriptor>
          <Statement mimeType="text/plain"> Track 1: Our Youthful Days (Moon Records)</Statement>
      </Descriptor>
      <Reference target="urn:mpegRA:mpeg21:dii:cid:1702.F109%2F0000011"/>

      <!-- "urn:mpegRA:mpeg21:dii:cid:1702.F109%2F0000011" refers to a Digital Item
        defined in a DID document "SampleTrack1" on the server "www.cidf.org" -->
    </Item>

    <Item>
      <Descriptor>
          <Statement mimeType="text/plain">Track 2: Tomoshibi (GME)</Statement>
      </Descriptor>
      <Reference target="urn:mpegRA:mpeg21:dii:doi:10.1000%2F0003#TRACK_2"/>

      <!-- "urn:mpegRA:mpeg21:dii:doi:10.1000%2F0003" refers to
           a DID document file "SampleTrack2" located on the server "www.doi.org" -->

    </Item>

  </Item>
</DIDL>

- - - - - - - - - - - - - - - - - - - - - - - - -
(File b) A DID document "SampleTrack1" located on the server "www.cidf.org" .
- - - - - - - - - - - - - - - - - - - - - - - - -

<?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>

    <Component>
      <Resource ref="http://ltssg3.epfl.ch/~mpeg-21/Track1.mid" mimeType="audio/midi"/>
    </Component>

  </Item>
</DIDL>

- - - - - - - - - - - - - - - - - - - - - - - - -
(File c) A DID document "SampleTrack2" located on the server "www.doi.org".
- - - - - - - - - - - - - - - - - - - - - - - - -

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

  <Item id="Track2">
    <Component>
      <Resource ref="http://ltssg3.epfl.ch/~mpeg-21/Track2.mid" mimeType="audio/midi"/>
    </Component>

  </Item>
</DIDL>
```

Figure 5 — Example: Referring to Digital Item in external DID Document

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4.5.3 Example: Referring to Resources stored on external server

Digital Item Identifiers can also be used to refer to Media Resources stored on external servers. In this case, the association of Identifier with Media Resources are not explicitly declared in DID as in Figure 5 but made by external identifier providers. Identifiers in this example work just like URLs. Note that the same assumption is used as Figure 5 for the URN form.

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

  <Item id="Track3">

    <!-- Music data (MIDI) -->
    <Component>
      <Descriptor>
        <Statement mimeType="text/plain">Our Youthful Days (MIDI)</Statement>
      </Descriptor>
      <Resource ref="urn:mpegRA:mpeg21:dii:cid:1702.F109%2F0000101" mimeType="audio/midi"/>
    </Component>
<!-- Commentary (HTML) -->
    <Component>
      <Descriptor>
        <Statement mimeType="text/plain">Comment of this music</Statement>
      </Descriptor>
      <Resource ref="urn:mpegRA:mpeg21:dii:doi:10.1000%2F0001" mimeType="text/html"/>
    </Component>

  </Item>
</DIDL>
```

Figure 6 — Example: Referring to Resources stored on external server

4.5.4 Example: Identifying a Sound Recording and the related Underlying Musical Work

This example shows how to uniquely identify a resource (an MPEG Audio Layer III-coded sound recording) within a Digital Item using an International Standard Recording Code (ISRC).

This example also highlights how to associate a related identifier (here: identifying the underlying music work with an International Standard Work Code (ISWC)) with such a resource.

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

  <Item>
    <Component>
    <Descriptor>
      <Statement mimeType="text/xml">
         <dii:Identifier>urn:mpegRA:mpeg21:dii:isrc:US-ZO3-99-32476</dii:Identifier>
         <!-- ISRC identifying the sound recording -->
      </Statement>
    </Descriptor>

    <Descriptor>
      <Statement mimeType="text/xml">
         <dii:RelatedIdentifier>urn:mpegRA:mpeg21:dii:iswc:T-034.524.680-1</dii:RelatedIdentifier>
         <!-- ISWC identifying the underlying musical work -->
      </Statement>
    </Descriptor>

      <Resource ref="Track01.mp3" mimeType="audio/mp3"/>
    </Component>

  </Item>
</DIDL>
```

Figure 7 — Example: Identifying a Sound Recording and the related Underlying Musical Work

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4.5.5 Example: Identifying a Digital Item Type

This example shows how to identify a special Digital Item Type “Foo Digital Item”, which is assumed for this example to have been specified in one of the parts of ISO/IEC 21000.

A terminal receiving this Digital Item will therefore be able to detect that it is a Foo Digital Item and act accordingly.

```
<?xml version="1.0"?>
<DIDL xmlns="urn:mpeg:mpeg21:2002:01-DIDL-NS"
        xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS"
  <Item>
    <!-- identifying that this is a "Foo Digital Item Type" -->
    <Descriptor>
      <Statement mimeType="text/xml">
        <dii:Type>Foo Digital Item</dii:Type>
      </Statement>
    </Descriptor>
    <!-- Here comes the actual information for the "Foo Digital Item Type" -->
    <Item>
        ...
    </Item>
  </Item>
</DIDL>
```

Figure 8 — Example: Identifying a Digital Item Type

5 Identification of Description Schemes

The XML Schema definition[9)] specifies how to use XML-based Description Schemes within Digital Items by identifying them through their XML namespace identifier.

ISO/IEC 21000-2 allows to include non-XML-based descriptors into Digital Items by identifying the description scheme through a unique namespace identifier (i.e. a URI).

Example 3 (Clause 9.3) of ISO/IEC 21000-2 gives an example of how to identify description schemes and to include metadata from such identification schemes into a Digital Item.

9) As defined in W3C. *XML Schema – Part 1: Structures.*

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Annex A
(normative)

Requirements for the Registration Authority for Digital Item Identification Systems

A.1 Identifications Systems to be registered for use within ISO/IEC 21000

Many identifiers will have the form of a URN. Whilst many existing identification systems use their own URN namespace (e.g. the International Standard Book Number with `urn:isbn`), not all systems do so. In order to allow such systems to easily obtain URN conformant identifiers to be used within ISO/IEC 21000, a Registration Authority is needed.

The Registration Authority will, under its own URN namespace, be able to register identification schemes. This helps users of the ISO/IEC 21000 to identify different Identification Schemes for use within the ISO/IEC 21000. For example, the form of `urn:mpegRA:mpeg21:dii:cid:1702.F109%2F0000011` can be used for Digital Item Identifiers when an Identification Scheme "cid" is registered to this Registration Authority by an identifier provider (here: the cIDf). Note that the first part of the string "`urn:mpegRA`" is the registered URN namespace of this Registration Authority, the next part "`mpeg21:dii`" is defined by this Registration Authority for the purpose of classification of URIs under their auspices, the string "`cid`" is assigned to the particular Identification Scheme by the Registration Authority, and the last part, "`1702.F109%2F0000011`" is a content identifier issued by the cIDf. It should be noted that the namespace identifier "`urn:mpegRA`" is used as an example only.

A.2 Procedure for Requesting an Identification System Identifier for use within ISO/IEC 21000

To use an Identification System within ISO/IEC 21000, the provider of the identifier shall apply to the Registration Authority. Registration forms shall be available from the Registration Authority.

The requester shall provide the registration information specified in Annex A.6. Companies and organisations are eligible to apply.

A.3 Responsibilities of the Registration Authority

The primary responsibilities of the Registration Authority administrating the registration of Digital Item Identification Systems are outlined in this annex; certain other responsibilities may be found in the JTC 1 Directives. The Registration Authority shall:

a) Obtain at least one URN namespace to be used as a prefix for URN-formed identifiers to be used in accordance with ISO/IEC 21000-3. If the Registration Authority already has its own namespace, the Registration Authority may either use the existing namespace or register a new one;

b) Implement a registration procedure for application for an Digital Item Identification System Framework in accordance with the JTC 1 Directives;

c) Receive and process the applications for allocation of a Digital Item Identification System from application providers;

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d) Ascertain which applications received are in accordance with this registration procedure, and to inform the requester within 30 days of receipt of the application of their assigned Digital Item Identification System;

e) Inform application providers whose request is denied in writing with 30 days of receipt of the application, and to consider resubmissions of the application in a timely manner;

f) Maintain an accurate register of the allocated Digital Item Identification Systems. Revisions to format specifications shall be accepted and maintained by the Registration Authority;

g) Make the contents of this register available upon request to National Bodies of JTC 1 that are members of ISO or IEC, to liaison organizations of ISO or IEC and to any interested party;

h) Maintain a database of Digital Item Identification System request forms, granted and denied. Parties seeking technical information on the format of private data which has a Identification System within ISO/IEC 21000- shall have access to such information which is part of the data base maintained by the Registration Authority;

i) Report its activities annually to JTC 1, the ITTF, and the SC 29 Secretariat, or their respective designees on an annual basis; and

j) Accommodate the use of existing Digital Item Identification Systems whenever possible.

A.4 Contact information for the Registration Authority

To be determined.

A.5 Responsibilities of Parties Requesting a Identification System within ISO/IEC 21000

The party requesting a Digital Item Identification System shall:

a) Apply using the Form and procedures supplied by the Registration Authority;

b) Include a description of the purpose of the Digital Item Identification System, and the required technical details as specified in the application form;

c) Provide contact information describing how a complete description can be obtained on a non-discriminatory basis;

d) Agree to institute the intended use of the granted Digital Item Identification System within a reasonable time frame; and

e) To maintain a permanent record of the application form and the notification received from the Registration Authority of a granted Digital Item Identification System.

A.6 Appeal Procedure for Denied Applications

The Registration Management Group is formed to have jurisdiction over appeals to denied request for an Identification System within ISO/IEC 21000. The RMG shall have a membership who is nominated by P- and L-members of the ISO technical committee responsible for ISO/IEC 21000. It shall have a convener and secretariat nominated from its members. The Registration Authority is entitled to nominate one non-voting observing member.

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The responsibilities of the RMG shall be:

a) To review and act on all appeals within a reasonable time frame;

b) To inform, in writing, organizations which make an appeal for reconsideration of its petition of the RMGs disposition of the matter;

c) To review the annual report of the Registration Authorities summary of activities; and

d) To supply Member Bodies of ISO and National Committees of IEC with information concerning the scope of operation of the Registration Authority.

A.7 Registration Application Form

Contact Information of organization requesting a Digital Item Identification System to be included into the maintained list of identification schemes

Organization Name _____

Address: _____

Telephone: _____

Fax: _____

E-mail: _____

WWW: _____

Request for a specific Digital Item Identification System to be included into the maintained list of identification schemes

NOTE If the system has already been implemented and is in use, fill in this item and A.6.3 and skip A.6.5, otherwise leave this space blank and skip to A.6.3.

Short description of Digital Item Identification System that is in use and date system was implemented

Statement of an intention to apply the assigned Digital Item Identification System

Date of intended implementation of the Digital Item Identification System

Authorized representative

Name: _____

Title: _____

Address: _____

Email: _____

Signature _____

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Annex B
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Interoperability Considerations on Resolution Systems

B.1 Introduction

This specification mandates that any identification scheme for ISO/IEC 21000-3 shall be a URI. The vision for ISO/IEC 21000, however, 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, not just to describe Digital Items superficially. In that sense, it is meaningful to show how existing ID schemes, as actually used in different communities, can be used as URN-based identifiers in accordance with ISO/IEC 21000-2 (Digital Item Declaration). In order to provide a practical view, a real implementation example with on-line resolution is provided in this informative annex.

B.2 Necessary Functions and Resolution System Switcher

Figure B.1 shows the relation between DID documents, media resources, and identifiers. Two DIDL elements: REFERENCE which refers to external elements such as CONTAINER, ITEM, COMPONENT, DESCRIPTOR, ANCHOR, or ANNOTATION, and RESOURCE, which specifies an external media resource of a COMPONENT, are carried within URI identifiers (e.g. URL or URN) in DID documents. When a RESOURCE or REFERENCE element is selected by a user with the DID browser, the referred element or the specified media resource can be obtained through the network if an on-line resolution service is available.

If the identifier is a URN, the URN is first converted into the corresponding locator such as URL, and then the referred element or specified media resource is obtained. The problem is, however, that there are several different kinds of ID resolution methods such as thttp, handle system, and Z39.50 [20]. Accordingly, the following two actions are necessary to handle URN-based IDs in DID documents.

— The ID scheme managing the identifier is identified from the URN string (identifier).

— The relation of the identifier to the URL, individually managed in the specific ID scheme, is resolved and the URL is acquired through the network.

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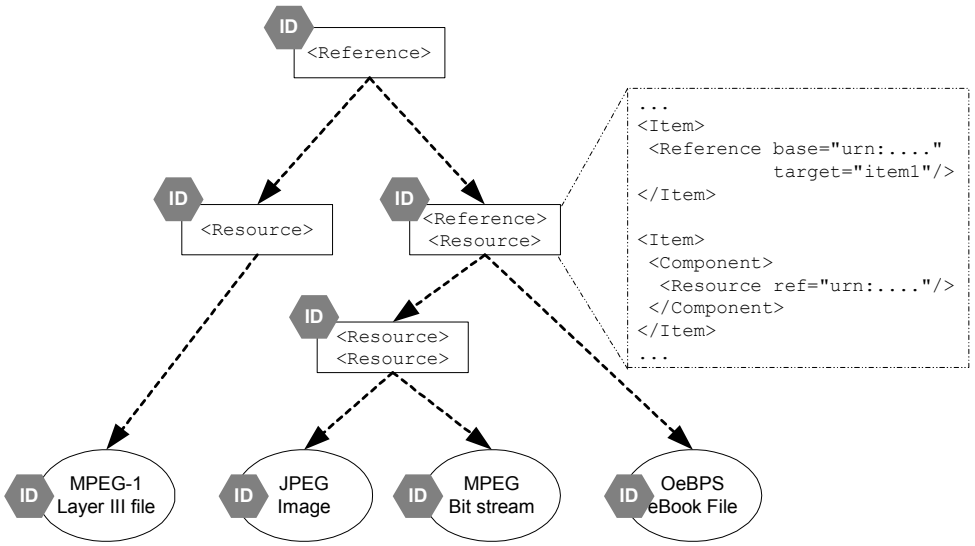

Figure B.1 — Relation of DID documents, media resources, and identifiers

An implementation example, called Resolution System Switcher (RSS), for these two functions is considered. RSS proceeds in the following way as depicted in Figure B.2: REFERENCE or REFERENCE element is selected in a DID document by User with DID browser.

The URN string, which refers to an external DIDL element in REFERENCE or specifies an external media resource in REFERENCE, is sent to RSS:

— The ID scheme is identified by URN parsing;

— The corresponding on-line ID resolution method is selected from a repository;

— URL is determined using the selected on-line ID resolution method for the specified ID scheme;

— The URL string is returned to the DID browser;

— The referred external DIDL element or the specified external media resource is acquired by using the URL and displayed.

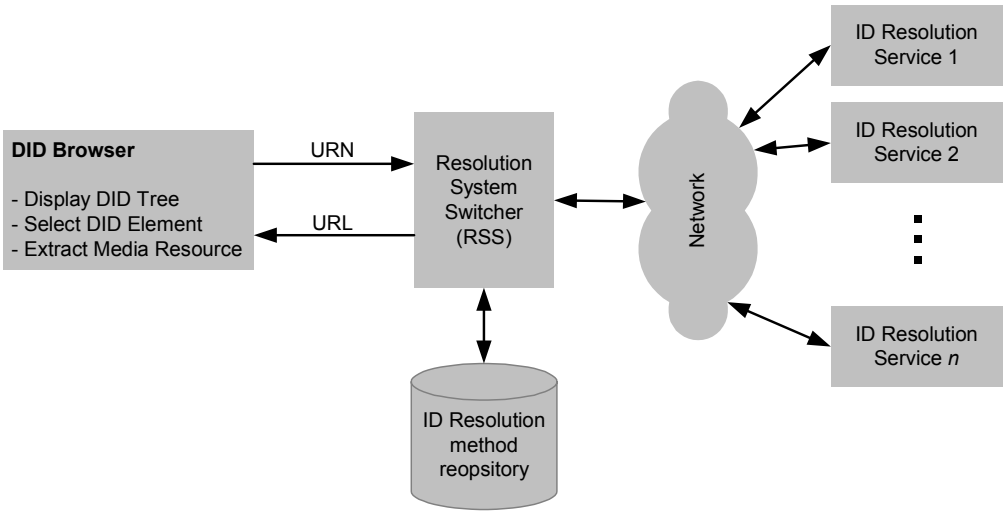

Figure B.2 — An Implementation Example: Resolution System Switcher (RSS)

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Two implementation models are possible for RSS. The first one is the Remote RSS model (the client-server model), where most functions are offered by a common server. This allows different kinds of terminal to share it (terminal architecture independent), and also makes it easier to adopt new ID schemes because no updating on the user side is needed. The other implementation model is the Local RSS model (plug-in model), where all functions are realized on the terminal side. This makes implementation simpler and, in addition, processing overheads are lighter than is true with the Remote RSS model.

B.3 An Overall Example of a DID Browsing System with Resolution System Switcher

An example of an overall DID browsing system that includes RSS is shown in Figure B.3. The system consists of four parts:

— DIDBS (DID Browsing Server) is used to convert DID documents stored in the server into HTML equivalents (called “visualization”) so that ordinary HTML browsers such as Internet Explorer and Netscape Navigator can display them on the terminal's screen, and to extract URN strings from DID documents. DIDBS also mounts RSS (Remote RSS model) that sends a resolve request with the URN to the selected on-line ID resolution system.

— The On-line ID resolution system translates the ID into its corresponding URL. It is assumed that each ID scheme has its own on-line resolution system based on its own communication protocols. The example uses two different URN-based ID schemes: “Content ID” provided by cIDf and “DOI” provided by IDF, both of which are listed in Annex C of this specification.

— Content Providers are WWW servers that store DID documents and/or media resources.

— User terminal is an ordinary personal computer for the end-user. It is connected to the Internet and has a Web browser to access the DIDBS.

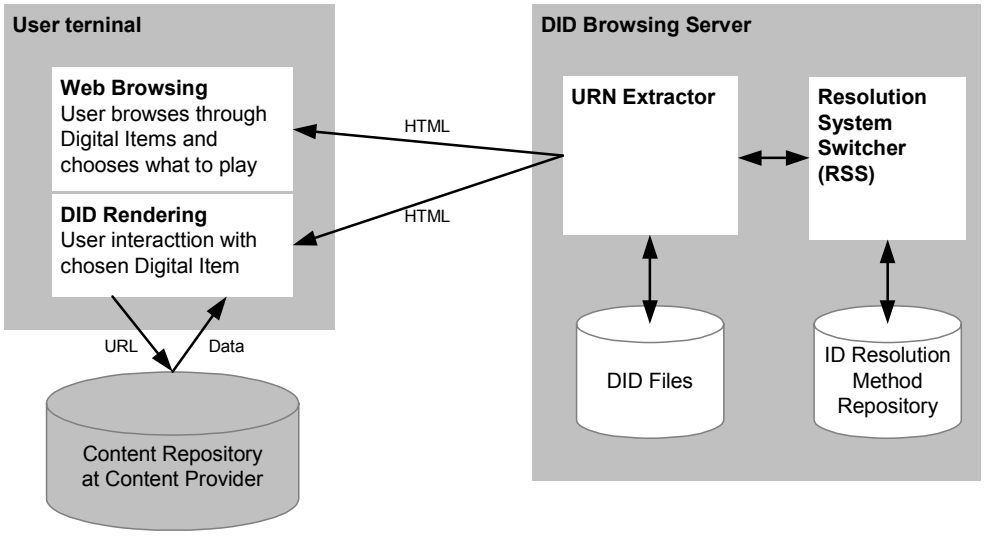

Figure B.3 — Overall Configuration of DID Browsing System with RSS

B.4 Summary

The two key actions needed to retrieve Digital Items in DID documents referenced by URN-based ID schemes have been described as (1) identify the ID scheme from the URN string, and (2) access the appropriate on-line ID resolution system based on its own access method.

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Annex C
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List of existing Identification and Description Schemes

This Annex contains a list of systems that support identifying and describing Digital Items. These Identification and Description Schemes are either in development or already in use. Please note, that this list is non-exhaustive.

C.1 Common Information System – CIS

The Common Information System plan (CIS) is a collaborative information processing development to have come out of the CISAC (Confédération Internationale des Sociétés d´Autheurs et Compositeurs) affiliated societies. The purpose of CIS is to develop the critical information infrastructure required to enable rights societies to effectively protect and administer collective rights in the digital age (see www.cisac.org).

It is designed to harmonise the many duplicate sets of data managed independently by royalty collection societies and music publishers with their individual and unrelated numbering schemes. To become efficient and integrated all parties need to be able to identify the same musical work by a single unique identification number no matter where in the digital world it is exploited. This can be achieved by societies working together to standardise the way information is structured within a common system architecture. It will enable societies and publishers to create more efficient mechanisms for exchanging information to support automated transactions for the licensing, tracking and monitoring functions demanded by a dynamic digital trading environment.

C.2 Content ID Forum – cIDf

The unique copyright code called the Content ID which is to be embedded into each digital content using watermarking technologies. The Content ID Forum expects that the embedded code will provide far-reaching benefits. In particular, it will make easier to clarify the copyrights of digital contents (copyright). Copyright holders can expect valid compensation when their contents are sold and/or re-used (payment assurance)

cIDf tries to make this "Content ID" the de facto standard in Japan as the first step. However, it will also take global standardization into account so that it will remain consistent with other global standards. In addition, verification experiments and joint discussions are planned in cooperation with other standardization bodies on a global scale.

Two types of user equipment will be used for digital content distribution. The first one is closed-type (dedicated) equipment. This is designed for limited usage and is mainly used in a passive manner, only for viewing and listening. DAT, MD and DVD players are of this type and mainly simple copy protection technology such as "scrambling" and "copy-flag" is now being commercialised, especially for MP3 and DVD players. The second one is open-type (general) equipment, which is designed for active usage where digital processing and editing are featured. Open-type equipment is typically based on personal computers. The target equipment of this forum is open-type because it will become most important to achieve a content commerce platform through which users can freely copy, process, and even re-distribute digital contents across networks. Some kind of advanced copyright protection mechanisms will be required for open-type equipment to encourage content commerce.

The Content ID is intended for all forms and combinations of digital contents including sound (speech and music), visual material (still images and moving pictures), computer graphics, digitised maps, and documents (text).

Further information on cIDf can be found on http://www.cidf.org.

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C.3 Digital Object Identifier – DOI

The Digital Object Identifier (DOI®) is a currently implemented system for interoperable identification and description of intellectual property in the digital environment. It provides an extensible framework for managing intellectual content in any form at any level of granularity, for linking customers with content suppliers, for facilitating electronic commerce, and enabling automated copyright management for all types of media. The International DOI Foundation manages development, policy and licensing of the DOI to registration agencies and technology providers and advises on usage and development of related services and technologies. The DOI is an integrated system made up of a number of interacting components that depend on one another for their value; the four primary components are:

— Enumeration: assigning an alphanumeric string to an intellectual property entity that the DOI identifies. Enumeration is specified by the DOI Syntax, a standard by the National Information Standards Organization (NISO), ANSI/NISO Z390.84 (2000).

— Description: creating a description of the entity which has been identified with a DOI, expressed as structured metadata. The interoperable metadata associated with each DOI is specified from principles of the Indecs framework (see below), and allows mappings from any structured metadata implementations in specific sectors to provide the practical basis for the development of DOI Application Profiles. Application Profiles include a structured common set of attributes appropriate to the class of intellectual property concerned.

— Resolution: making the identifier "actionable" by providing information linked to the DOI, and the technology to deliver the services that this can provide to users. The DOI system uses the Handle System®, which provides a globally distributed capability for assigning, managing, and resolving persistent identifiers, known as "handles" to facilitate the access of digital objects and other resources on networks such as the Internet over long periods of time. Handle resolution enables an identifier (DOI) to resolve to multiple pieces of current state data such as type(s) and location(s) of instances of the identified entity, type(s) and location(s) of associated metadata, public keys, accessibility, etc. The Handle System contains additional features not yet taken up in public DOI implementation which may be adopted in future DOI developments (e.g. trusted resolution using Public Key Infrastructure is used internally in DOI administration – granting permission levels for administrators – but not yet in public applications, but there are obvious potential applications for this technology related to rights management, which are now being investigated at prototype stage by International DOI Foundation).

— Policies: the rules that govern the implementation and operation of the system. These are determined by the International DOI Foundation, a not-for-profit open membership organisation set up for the purposes of developing and governing the DOI System.

A fundamental design principle of DOI is that each of these components is extensible: the enumeration syntax allows the maximum flexibility of assignment using newly created or existing identifier sequences; the descriptive metadata follows an extensible framework; the underlying resolution system can be extended across multiple dimensions, including the number and types of data items associated with DOIs, the protocols used to address the resolution system, the authentication methods which can be used both in resolution and administration, and the scaling and distribution of the core resolution service.

The current implementation offers DOI as a fully working identification system; however there is considerable additional development occurring (in collaboration with existing and potential users, and with many other organisations) in terms of both policies and additional functionality. In particular, the use of DOIs in rights management environments and other uses, of which the ISO/IEC 21000 is an exemplar, offers significant potential benefits but requires further development of underlying technologies such as rights data dictionary and rights expression languages (as has been noted in ISO/IEC 21000-3).

The DOI Handbook is the key documentation of the DOI System. It forms part of the DOI web site. It presents the main elements of the DOI in a form that can be easily assimilated by the non-technical reader, and provides a central point of reference for more complex technical content.

More information on DOI can be found at http://www.doi.org.

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C.4 Dublin Core Metadata Initiative – DCMI

The Dublin Core Metadata Initiative DCMI is an open forum engaged in the development of interoperable online metadata standards that support a broad range of purposes and business models. DCMI's activities include consensus-driven working groups, global workshops, conferences, standards liaison, and educational efforts to promote widespread acceptance of metadata standards and practices.

More Information on the Dublin Core Metadata Initiative can be found on http://purl.oclc.org/dc/.

C.5 The EAN/UCC System

The UPC (Universal Product Code) is used in the US and Canada, while the EAN is used everywhere else. These numbering schemes are not specific to the music industry and are used extensively to identify trade items (defined as a products or services), and are also the basis for the bar codes that we all see on retail products.

Although UPC and EAN numbers are of different lengths (12 and 13 digits respectively), they are similarly structured. The difference in length between the two schemes does present compatibility problems; EAN based systems can process UPC numbers but the UPC based system cannot process EANs because they can only deal with 12 digits. This situation is planned to be resolved in 2005 when the US system is warranted to support 14 character codes (see http://www.uc-council.org/2005Sunrise).

There is no central database for EAN/UCC numbers although there are some local initiatives. Many agencies only offer a service to identify who has issued a number and not what a number actually identifies.

More Information on the EAN/UCC System can be found on http://www.ean-int.org and http://www.uc-council.org.

C.6 Global Release Identifier – GRID

The international trade bodies representing music publishers, authors, composers and the recording industry have agreed to develop jointly a global identification scheme for digital music content. The main aim of the project is to enable efficient management of the delivery of music online.

The four major players of the music industry, RIAA, IFPI representing record companies and CISAC and BIEM representing authors and publishers, are now working together on the project with consultants Rightscom to develop a system for identifying transactions involving sound recordings and multimedia packages including music.

In a fast-changing digital world where music can be "packaged" in a range of different formats, a unique identifier will be crucial in enabling the delivery of music content to consumers, and the management of the associated rights. The identifier will aim to support the sales, licensing and tracking needs crucial to the successful operation of online commerce.

The project will be integrated as far as possible with already existing identification systems, such as the International Standard Recording Code (ISRC), the International Standard Musical Work Code (ISWC), as well as systems currently in place that identify composers, authors and music publishers.

A current problem for example, is that even if a recording has an identifier such as an ISRC or a proprietary number allocated by the record company, it is still very difficult to trace the way in which the use of the musical composition is licensed. The new identifier will help to solve these problems.

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C.7 Identifier for Versions of Audiovisual works – V-ISAN

International Standard ISO 20925:—[10)] was developed within Technical Committee ISO/TC 46, Information and documentation, Subcommittee SC 9, Identification and description. The project was initiated by the Society of Motion Picture and Television Engineers (SMPTE) and developed in cooperation with the participants in ISO Project 15706 (ISAN).

This International Standard specifies a system for version identification of audiovisual works to be used in conjunction with the International Standard Audiovisual Number (ISAN) defined in ISO 15706. An ISAN combined with the version identifier specified in Clause 4 of the ISAN Standard shall be known as a V-ISAN. A V-ISAN shall be a registered, globally unique identifier of a version of an audiovisual work.

A V-ISAN identifies a specific version of an audiovisual work throughout its life and is intended for use wherever precise and unique identification of a specific version of an audiovisual work would be desirable, such as in audiovisual production and distribution systems and in broadcasting applications. A V-ISAN identifies a specific version of an audio-visual work as the unique compound of its component elements (e.g. its artistic content, languages, editing, and technical format) throughout its life and independent of any physical form in which the version is distributed.

The assignment of a V-ISAN to a version of an audiovisual work shall not be used as evidence of the ownership of rights to either that version or to the audiovisual work itself.

C.8 International Standard Audiovisual Number – ISAN

This International Standard establishes and defines a voluntary standard numbering system for the unique and international identification of audiovisual works (as defined in clause 3.1).

An International Standard Audiovisual Number (ISAN) identifies an audiovisual work throughout its life and is intended for use wherever precise and unique identification of an audiovisual work would be desirable. As an identifier it can be used for various purposes such as: to assist allocation of royalties among right holders, to track use of audiovisual works, for information retrieval and for anti-piracy purposes such as verifying title registrations. The ISAN can also provide a basis for supplementary identification systems when version or product information is required (e.g. for applications such as broadcast automation and automated storage and retrieval systems).

An ISAN shall apply to the audiovisual work itself. It shall not be related to the physical medium of such an audiovisual work, or the identification of that medium. Annex A specifies examples of audiovisual works to which an ISAN may be issued and examples of works to which an ISAN shall not be issued.

The issuance of an ISAN shall in no way be related to any process of copyright registration, nor shall the issuance of an ISAN provide evidence of the ownership of rights in an audiovisual work.

More Information on ISAN can be found on http://www.nlc-bnc.ca/iso/tc46sc9/isan.htm.

C.9 International Standard Book Number – ISBN

The ISBN (International Standard Book Number) is a unique machine-readable identification number, which marks any book unmistakably. This number is defined in ISO Standard 2108. The number has been in use now for 30 years and has revolutionised the international book-trade. 159 countries and territories are officially ISBN members. The ISBN accompanies a publication from its production onwards.

10) To be published.

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The number consists of ten digits:

— Group identifier

— Publisher identifier

— Title identifier

— Check digit

The ISBN is divided into four parts of variable length, which must be separated clearly by hyphens or spaces:

ISBN 0 571 08989 5 or ISBN 90-70002-34-5

The number of digits in the first three parts of the ISBN (group identifier, publisher prefix, title identifier) varies. The number of digits in the group number and in the publisher prefix is determined by the quantity of titles planned to be produced by the publisher or publisher group. Publishers or publisher groups with large title outputs are represented by fewer digits.

While the ISBN is a well-established system for the purpose of identifying monographic publications which can be represented in machine readable form as a 13-digit Bookland EAN bar code, it nevertheless requires some adaptation to meet the new requirements of the growing number of digital text formats which now exist.

In respect of changes to the ISBN a proposal is set out in the paper N285 The Digital World and the Ongoing Development of ISBN http://www.nlc-bnc.ca/iso/tc46sc9/docs/sc9n285.pdf. It encompasses an extension to the length of the number and extending the application of the number to formats other than printed books (i.e. eBook, PDF, DOC, and other emerging file formats for portable devices).

More information on ISBN can be found on http://www.isbn.spk-berlin.de/html/whatis.htm.

C.10 International Standard Recording Code – ISRC

The purpose of this International Standard is to define and promote the use of a standard code for the unique identification of recordings.

The International Standard Recording Code (ISRC) provides a means of identifying audio recordings and music video recordings internationally. The ISRC may be applied to such recordings regardless of whether they are in analogue or digital formats. The ISRC shall not be used for the numbering of audio or audio-visual carriers (e.g. compact discs or videocassettes).

An ISRC identifies the recording throughout its life and is intended for use by producers of recordings as well as by copyright organisations, broadcasting organisations, media libraries and archives, etc.

Audiovisual recordings, other than music video recordings produced in conjunction with an audio recording, are excluded from the scope of this International Standard. Such audiovisual recordings should be assigned an International Standard Audiovisual Number in accordance with ISO 15706.

Further information about ISRC can be obtained from IFPI, the International ISRC Agency (http://www.ifpi.org).

C.11 International Standard Serial Number – ISSN

The ISSN is an ISO standard for the identification of serials. A serial (as defined in ISO 3297) is a publication, in any medium, issued in successive parts, usually having numerical or chronological designations and intended to be continued indefinitely. Serials include magazines, newspapers, annuals (such as reports, yearbooks, and directories), journals, memoirs, proceedings, transactions of societies, and monographic series. ISSNs are currently assigned to serials in electronic media as well as to printed serials and serials in other physical media.

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For each serial that is assigned an ISSN there is a corresponding “key title” which is based on a commonly acceptable form of the title established at the time the serial is registered. If the title of the serial changes over the course of its publication, a determination is made as to whether the change would require the establishment of a new “key title”. If a new “key title” is required, a new ISSN is assigned to identify what at that point is regarded as a new serial.

The ISSN consists of eight digits. The first seven digits are in Arabic numerals in a range from (0 to 9). The last digit (a check digit calculated on a Modulus 11 basis) may be an Arabic numeral (0-9) or a roman numeral (X) representing the number 10). The ISSN functions simply as a unique identifier; the number conveys no meaning with respect to the language, country, publisher, or other attribute of the serial it identifies.

For purposes of display, the ISSN is presented as two groups of four digits separated by a hyphen, and is preceded by the prefix “ISSN” and a space. The prefix functions as an identifier for the ISSN identification system. The International ISSN Centre has registered the prefix as a Uniform Resource Name (urn:issn).

The International ISSN Centre has established a common set of data elements (ISO 3297 - Annex A) that is used for the registration of serials in the ISSN international database. The data element set includes, in addition to the ISSN and Key title, descriptors such as title proper, imprint, date(s) of publication, publication status, frequency, physical medium, language of publication, classification, and a number of links to related serials (other language editions, other physical media, succeeding titles, supplements, etc.). An exchange format for the data has been defined in conformance with ISO 2709.

As the registration authority for the ISSN, the International ISSN Centre is responsible for the overall governance of the identification system, the certification of the national and regional registration agencies, and the maintenance of a central database of all ISSN assignments and descriptive data. The ISSN system encompasses a worldwide network of registration agencies that are responsible for processing registrant applications and maintaining databases of national and regional registrations.

C.12 International Standard Textual Work Code – ISTC

The purpose of the International Standard Textual Work Code (ISTC) is to enable the efficient identification and administration of textual works. The ISTC provides a means of uniquely and persistently identifying works of text for use by authors, agents, publishers, retailers, librarians, rights administrators and other interested parties on an international level.

The ISTC shall be applicable to works whose content is manifested or expressed predominantly in textual form.

The ISTC shall not be applied to manifestations or expressions of a textual work, including any physical products (e.g. a printed article) or electronic formats (e.g. an electronic book) based on the content of the work. Such manifestations or expressions are the subject of separate identification systems such as ISBN and SICI.

The ISTC should be applied to a textual work when there is the intention to disseminate such a work at any point from creator to user. It provides an identification data element for applications that record and exchange information about textual works and related manifestations. For example, the ISTC may be used for the purposes of collocating subsequent manifestations or expressions of a work in applications involving electronic rights administration and information retrieval.

The assignment of an ISTC to a work has no meaning or value as legal evidence regarding the copyright status or rights to a work

C.13 International Standard Work Code – ISWC

This International Standard specifies a means of uniquely identifying a musical work. It standardizes and promotes internationally the use of a standard identification code so that musical works can be uniquely distinguished from one another within computer databases and related documentation and for the purposes of collecting societies involved in the administration of rights to such works.

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The International Standard Musical Work Code (ISWC) identifies musical works as intangible creations. It is not used to identify manifestations of or objects related to a musical work. Such manifestations and objects are the subject of separate identification systems, such as the International Standard Recording Code (ISRC) for sound recordings, the International Standard Music Number (ISMN) for printed music, and the International Standard Audiovisual Number (ISAN) for audiovisual works.

C.14 INteroperability of Data in E-Commerce Systems – INDECS

The Indecs project developed an analysis of the requirements for metadata for e-commerce in Intellectual Property (IP) in the network environment. This analysis has received widespread support.

At its heart, Indecs proposed a very simple generic model of commerce: people make stuff; people use stuff; and (for commerce to take place) people make deals about the stuff. If secure machine-to-machine management of commerce is to be possible, the stuff, the people and the deals must all be securely identified and described in standardised ways that machines can interpret and use – metadata.

This "metadata" is crucial to all e-commerce, but is particularly relevant to commerce in IP where the goods being traded are intangible rights rather than tangible goods. With the increasing granularity of the IP being traded, metadata is never likely to come from a single source or to follow a single standard for identification and description. If metadata from different sources is to interoperate successfully, it must, though, be developed within a coherent and consistent view of the things that are being described so that such views can be successfully mapped to others.

Central to the analysis is the assumption that it is possible to produce generic mechanism to handle complex metadata for all different types of IP. So, for example, instead of treating sound carriers, books, videos and photographs as fundamentally different things with different (if similar) characteristics, they are all recognised as creations with different values of the same higher-level attributes, whose metadata can be supported in a common environment.

Any serious approach to the problem of interoperability of metadata for IP in the network environment needs to support interoperability of at least five different types:

— Across media (such as books, serials, audio, audiovisual, software, abstract works, visual material).

— Across functions (such as cataloguing, discovery, workflow and rights management).

— Across levels of metadata (from simple to complex).

— Across semantic barriers.

— Across linguistic barriers.

The Indecs project has proposed a framework, described in detail in the final project documents, within which such interoperability could be achieved.

More Information on INDECS can be found on http://www.indecs.org.

C.15 ONline Information eXchange – ONIX International

ONIX International is the international standard for representing and communicating book industry product information in electronic form, incorporating the core content which has been specified in national initiatives such as Book Industry Communication (BIC) Basic (in the UK) and the Association of American Publishers' (AAP) ONIX Version 1. It aims to achieve the following objectives:

— To cover not only books but also other media which are published and distributed through the book industry.

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— To meet the practical information needs of all sectors of the industry, including but not limited to online booksellers.

— To reflect the realities of national and international rights, distribution, pricing and availability.

— To be usable in a multilingual marketplace.

— Very importantly, to incorporate the core content which has been specified in national initiatives such as BIC Basic and AAP's ONIX.

— Finally, to build where possible on what the EDItEUR Product Information Communication Standard (EPICS) and the Indecs Project have done to establish sound models for metadata in a future electronic environment.

Not all of these goals will be met completely or equally in a single step. The coverage of Release 1.1 is based on two principal sources: the AAP's ONIX Version 1, published in January 2000, and an extensive list of data elements required in UK trade practice which was compiled by BIC during 1999. Future releases, while maintaining stability of the core content, will extend the scope of the standard.

The EPICS/ONIX family of standards is maintained by EDItEUR under the direction of an international steering group. The secretariat of EDItEUR and of the EPICS/ONIX International Steering Group is located at Book Industry Communication (BIC) in London.

US implementation and input to the international steering group are co-ordinated through the ONIX International Policy Committee of the Book Industry Study Group (BISG).

UK implementation and input to the international steering group are co-ordinated through the BIC Product Metadata Committee.

Further information about ONIX can be obtained from EDItEUR, who is co-maintaining ONIX: http://www.editeur.org/onix.html.

C.16 URL-based Identification Schemes

The URL [7] syntax conforms to the URI [6] standard and leads to a specific class of identifiers. An item identifier based on the URL syntax contains a generic Internet domain name followed by an item-specific part. The domain name may be owned by an item provider company or by a centralised organisation (such as a registration authority service, item provider consortium, etc.). The item-specific part is usually managed by this same company or organisation; it may be based on an existing numbering scheme or on a specific one.

The identifier can point to data concerning the item and of interest to Users; for this purpose, it naturally takes advantage of the existing Internet resolution (DNS and for example HTTP) and server infrastructure. The identifier may point to an XML page that can be parsed automatically or to an HTML human-readable page, for example:

— http://www.a-isan-registration-authority.org/5f7b.xml

— http://www.an-item-provider.com/specific-ids/abc-1234-def.xml

— http://www.an-item-provider.com/existing-standard-ids/90-70002-34-5.html (this approach is already in use for on-line book referencing)

The URL-based identification scheme provides the following main features:

— Only knowing this identifier, anybody can have a straightforward access to some of the information on the item, specifically to the legal information on the item. This is considered as a key feature for Intellectual Property protection in a professional context;

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— The item providers can have a full control over the infrastructure;

— The scheme uses existing infrastructure and its cost is thus low;

— It is possible to have access control to (some of) the data pointed to by the identifier (for example, with HTTP authentication);

— The identifier can be based on other existing standard identifiers;

— The approach does not provide a specific technical mechanism for persistence; the persistence level of the scheme depends on the persistence of the domain name chosen for each business case. It can range from very long-term persistence (for example, using a standard organisation domain name for professional applications) to short-term persistence (for example, using a privately-owned domain name for family photo albums).

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Annex D
(informative)

Patent statements

The International Organization for Standardization and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this part of ISO/IEC 21000 may involve the use of patents.

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured ISO and IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with ISO and IEC. Information may be obtained from the companies listed below.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 21000 may be the subject of patent rights other than those identified in this annex. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

The table summarises the formal patent statements received and indicates the parts of the standard to which the statement applies. The list includes all organisations that have submitted informal patent statements. However, if no “X” is present, no formal patent statement has yet been received from that organisation.

Organisation	ISO/IEC 21000-3
Matsushita Electric Industrial Co., Ltd.	X
IBM	X

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