

## Appendix 6 DOI® Kernel Metadata Declaration specification and XML Schema

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*This appendix defines how to express Kernel Metadata Declaration, the mandatory minimum public metadata applicable to general intellectual property resources identified by a DOI® name, in XML.*

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### A6.1 The DOI® Resource Metadata Kernel Declaration

#### A 6.1.1 Introduction

The DOI® Kernel (or *DOI Resource Metadata Kernel Declaration* to give it its full name) is the IDF's standard for a minimal public declaration of metadata to enable the simple discovery and disambiguation of created resources identified with a DOI name. Each resource identified with a DOI name must have a supporting Kernel Declaration, produced as an XML document according to the XML schema *resourceKernel.xsd* (see A6.5) and its supporting specification (see A6.2).

This document includes a summary of the data elements and allowed values for DOI Kernel declarations, details of which are given in full in the *resourceKernelEnumerations.xsd* (see A6.6) and its supporting specification (see A6.3).

#### A6.1.2 Allowed values for Kernel elements

Eight of the Kernel elements have controlled lists of allowed values which must be used. These lists are registered in the indecs Data Dictionary (iDD), the IDF's ontology. They are published in tabular form below and included in the *resourceKernelEnumerations.xsd*.

Allowed value lists for two elements (*structuralType* and *mode*) are "closed", and cannot be added to except by change in IDF policy. Lists for the other six elements are "open" and may be added to at any time by a Registration Authority by registering new values with the iDD. These values are then mapped to the DOI® ontology as a whole to ensure full interoperability within the DOI® RA network.

#### A6.1.3 Use of "Restricted" values

Where a DOI name is issued under a Restricted Application Profile – that is, for private use only – it may still be necessary to issue a Kernel Declaration for system audit purposes, to show that the DOI name is registered and valid. However, the term "Restricted" may be used for all allowed values of mandatory elements, and optional elements left blank.

#### A6.1.4 Non-Kernel metadata declarations

The Kernel provides a simple, fully interoperable metadata declaration but is not intended to meet the full metadata requirements of a DOI® Application Profile. Metadata declarations of any other kind may be issued in support of DOI names in addition to the Kernel.

#### A6.1.5 Kernels for other entities

At the time of the issue of this document, DOI names are only being issued to identify created *Resources* (or *Creations*), and not for *People*, *Places* or *Events*. When, as is likely, DOI Application Profiles for such entities emerge, separate Kernel specifications will be produced.

## A6.2 Kernel Metadata Declaration: specification of data elements

| XML element<br>[attribute] | Occ | Datatype      | Definition  | Allowed Values,<br>examples, other<br>constraints  |
|----------------------------|-----|---------------|---|--|
| <b>registrationAgency</b>  | 1   | DOI name      | The DOI <sup>®</sup> Registration Agency responsible for issuing a Kernel Declaration.          | The DOI name of the RA issuing the Kernel Declaration.   |
| <b>issueDate</b>           | 1   | Date          | The Date on which the Kernel Declaration was made.  | ISO 8601 format (YYYY-MM-DD).  |
| <b>issueNumber</b>         | 1   | Integer       | The sequence number of this Declaration in the series of Kernel Declarations for this DOI name. | First issue=1. If a Kernel Declaration for a specific DOI name is re-issued, this number should be incremented by one.   |
| <b>resource</b>            | 1-n | Element Group | A group of elements describing a resource identified by a DOI name.                             |  |
| <b>DOI name</b>            | 1   | DOI name      | A DOI name that identifies a resource.  | Any DOI name.  |
| <b>resourceIdentifier</b>  | 0-n | String        | An identifier other than the DOI name applied to a resource.                                    | Any alphanumeric string which is unique within its domain of issue: for example, an ID from a legacy scheme or from the internal database of the resource's publisher. A <b>resourceIdentifier</b> is to be declared if one exists: some resources may have no Identifier other than a DOI name. If a Resource has, in error, more than one DOI name allocated to it, the alternative DOI name can be shown as a resourceIdentifier. |
| [type]                     | 1   | iDD Term      | The type of the resourceIdentifier.   | See <b>Allowed iDD Values for Kernel elements</b> . This is an open list so new types may be registered at any time by an RA.  |
| <b>structuralType</b>      | 1   | iDD Term      | The primary structural type of a resource.  | See <b>Allowed iDD Values for Kernel elements</b> . The four mutually exclusive <b>structuralTypes</b> (Physical, Digital, Performance and Abstraction) allow resources to be simply classified according to their overall form. Note  |

|                     |     |          |  |  |
|---------------------|-----|----------|--|--|
|                     |     |          |  | that the structuralTypes may be contained within one another: for example a CD (Physical) may contain files (Digital) which contain recordings of Performances of songs (Abstractions). However the structuralType is always defined by the overall form, so a CD is Physical. Elements of its content can be classified if necessary under <b>resourceType</b> .  |
| <b>mode</b>         | 1-3 | iDD Term | The principal sensory mode(s) in which a resource is intended to be perceived. | See <b>Allowed iDD Values for Kernel elements. mode</b> identifies only the principal <i>intended</i> modes of perception of a resource, recognizing that most physical resources are perceivable with all five senses, but that some of these perceptions may be trivial: for example, an ordinary CD or printed book may be touched or smelled, but these are supplementary or incidental to its intended function as a content carrier. For a Braille book, however, touch is a principal mode, as is smell for a perfume.  |
| <b>resourceType</b> | 1-n | iDD Term | The general type of a resource.  | See <b>Allowed iDD Values for Kernel elements.</b> This is an open list so new types may be registered at any time by an RA. <b>resourceType</b> typically describes the abstract nature of the content of a resource, irrespective of its structural type. For example, a resource may have the resourceType "JournalArticle" and a structural type of Abstraction, Digital or Physical. resourceType may, however, be extended to include format and genre elements: for example "ClassicalAudioCD" or "MedicalJournalArticlePDF" would be acceptable resourceType values if an RA wished to define and register them. resourceTypes may be defined at any level of granularity that is useful |

|                       |     |               |   |  |
|-----------------------|-----|---------------|---|--|
|                       |     |               |   | to an RA.  |
| <b>resourceName</b>   | 0-n | String        | A name or title by which a resource is known.   | Any. A <b>resourceName</b> is to be declared if one exists (some resources may have no name other than a DOI name or other unique identifier). Note that the only distinction between a <b>resourceName</b> and <b>resourceIdentifier</b> is that the latter is unique within its domain of issue. |
| [type]                | 1   | iDD Term      | The type of the resourceName.   | See <b>Allowed iDD Values for Kernel elements</b> . This is an open list so new types may be registered at any time by an RA.  |
| [primaryLanguage]     | 0-1 | ISO code      | The primary language of the resourceName.   | ISO 639-1 code values.   |
| <b>principalAgent</b> | 1-n | Element Group | The principal agent(s) responsible for a resource, normally but not necessarily its creator(s). | The specification of what constitutes a <b>principalAgent</b> for any given AP must be declared, but is at the discretion of an RA: for example, a specific AP may require only the Publisher of a resource to be declared, while another may require only the identity of one of its Creators.    |
| agentName             | 0-n | String        | A name by which the principal agent is known.   | At least one Name <i>or</i> one Identifier of a <b>principalAgent</b> must be declared.  |
| [type]                | 1   | iDD Term      | The type of the agentName.  | See <b>Allowed iDD Values for Kernel elements</b> . This is an open list so new types may be registered at any time by an RA.  |
| agentIdentifier       | 0-n | String        | An identifier of the primary agent.   | At least one Name <i>or</i> one Identifier of a <b>principalAgent</b> must be declared.  |
| [type]                | 1   | iDD Term      | The type of the agentIdentifier.  | See <b>Allowed iDD Values for Kernel elements</b> . This is an open list so new types may be registered at any time by an RA.  |
| agentRole             | 1-n | iDD Term      | The role(s) played by the primary agent.  | See <b>Allowed iDD Values for Kernel elements</b> . This is an open list so new agentRoles may be registered at any time by an RA.   |

### A6.3 Allowed iDD values for Kernel elements

This table shows the Allowed Values for the Kernel Elements which require them, as documented in the *resourceKernelEnumerations.xsd* (see A6.6).

A **Closed list** of values is one that cannot be added to except by a change in IDF policy.

An **Open list** of values is one that can be added to at any time by an RA registering a new value with the iDD. This value will be mapped to an iDD Term (either an existing Term or one created for the purpose) and that Term will then be added to the allowed values in the *resourceKernelEnumerations.xsd* schema.

| Element<br>iDD Allowed Values | Status of value list<br>Definition  | Constraints and comments   |
|-------------------------------|---|--|
| <b>structuralType</b>         | <b>Closed list</b>  |  |
| Abstraction                   | Of a resource which exists as a concept.  |  |
| Performance                   | Of a resource which is expressed in transient form.   |  |
| Digital                       | Of a resource which is fixed in digital form.   |  |
| Physical                      | Of a resource which is fixed in physical form.  |  |
| Restricted                    | Of a resource which is described by a restricted DOI Application Profile.                   | The Restricted structuralType may only be used for resources belonging to Restricted ApplicationProfiles and for which there metadata interoperability is not a requirement. |
| <b>mode</b>                   | <b>Closed list</b>  |  |
| Abstract                      | Of a resource which is not directly perceivable with any of the five human senses.          |  |
| Audio                         | Of a resource which is principally intended to be listened to.                              |  |
| Visual                        | Of a resource which is principally intended to be looked at.                                |  |
| AudioVisual                   | Of a resource which is principally intended to be listened to and looked at simultaneously. |  |
| Tangible                      | Of a resource which is principally intended to be touched.                                  |  |
| Restricted                    | Of a resource which is described by a restricted DOI Application Profile.                   | The Restricted mode is used for resources belonging to Restricted ApplicationProfiles and for which there metadata interoperability is not a requirement.                    |
| <b>resourceNameType</b>       | <b>Open list</b>  |  |
| Name                          | A name of a resource.   | A resource may have any number of Names.   |
| Title                         | A name of a created resource.   | A resource may have any number of Titles. If a preference is indicated between them then the PrincipalTitle and AlternativeTitle values should be used.                      |
| PrincipalTitle                | The Title by which a resource is mainly known.  | A PrincipalTitle may be supplemented by a Subtitle. The use of PrincipalTitle is contextual, as a resource may be mainly   |

|                  |   |  |
|------------------|---|--|
|                  |   | known by different Titles in different contexts. For example, a resource available in different countries may be known by Titles in different languages. By default, the PrincipalTitle means the Title by which the resource is mainly known by the Registrant at the time of issue of the Kernel Declaration.                        |
| AlternativeTitle | A Title other than a PrincipalTitle                 | See comments on PrincipalTitle.  |
| AbbreviatedTitle | A Title which is a shortened form of another Title. | The Title of which this is an abbreviation may or may not be included in the Kernel Declaration.   |
| Subtitle         | A Title which is supplementary to another Title.    | A resource cannot have a Subtitle without a Title to which it is supplementary. There may be more than one "pair" of Title/Subtitle for any given resource (especially if TranslatedTitles are included). By default a Subtitle is assumed to be supplementary to the PrincipalTitle, or the Title in the absence of a PrincipalTitle. |
| FormerTitle      | A Title by which a resource was once known.         | The use of FormerTitle is contextual: it means that at the issueDate of the Kernel declaration, this Title is no longer being actively used in newly created metadata, but may exist in legacy systems.  |
| TranslatedTitle  | A Title which is a translation of another Title.    | Only a resource's Title is translated for a TranslatedTitle: it does <i>not</i> refer to the Title of a Translation of the resource.   |

|                               |   |   |
|-------------------------------|---|---|
| <b>resourceIdentifierType</b> | <b>Open list</b>  |   |
| DOI name                      | A Digital Object Identifier issued under the authority of the International DOI Foundation. |   |
| ISBN                          | An International Standard Book Number, the ISO Standard Identifier for books.               |   |
| ISSN                          | An International Standard Serial Number, the ISO Standard Identifier for published Serials. |   |
| ISTC                          | An International Standard Text Code, the ISO Standard Identifier for textual works.         |   |
| PII                           | Publisher Item Identifier.  |   |
| UPC                           | A Universal Product Code.   |   |
| EditionNumber                 | An identifier of a resource which denotes its version.                                      |   |
| PartIdentifier                | An identifier of a resource in relation to another resource of which it is a part.          |   |
| ProprietaryIdentifier         | An identifier which is not in public use.   | For example, a publisher's own catalogue or stock number. |
| <b>agentNameType</b>          | <b>Open list</b>  |   |

|                            |  |   |
|----------------------------|--|---|
| Name                       | A name by which an agent is known.   |   |
| PrincipalName              | The Name by which an agent is mainly known.  | The use of PrincipalName is contextual, as an agent may be mainly known by different Names in different contexts. By default, the PrincipalName means the Name by which the agent is mainly known by the Registrant at the time of issue of the Kernel Declaration. |
| AlternativeName            | A Name other than a PrincipalName by which an agent is also known.                           | See comments on PrincipalName.  |
| FormerName                 | A Name by which an agent was once known.   | The use of FormerName is contextual: it means that at the issueDate of the Kernel declaration, this Name is no longer being actively used in newly created metadata, but may exist in legacy systems.   |
| IndividualName             | A Name of an agent that is a person.   |   |
| OrganizationName           | A Name of an agent that is an organization.  |   |
| <b>agentIdentifierType</b> | <b>Open list</b>   |   |
| ProprietaryIdentifier      | An identifier of an agent issued by an organization for proprietary purposes.                | For example, a publisher's internal author identifier.  |
| CaeNumber                  | The CISAC Composer, Author and Publisher ( <i>Compositeur, Auteur, Editeur</i> ) identifier. | CaeNumber   |
| <b>resourceType</b>        | <b>Open list</b>   |   |
| No values registered yet.  |  |   |
| <b>agentRole</b>           | <b>Open list</b>   |   |
| No values registered yet.  |  |   |

## A6.4 Namespace

All elements within the **KernelMetadata** tags belong to the <http://www.doi.org/> namespace, which is declared as an IDF namespace with permissible names as defined within this document. Kernel metadata could be derived from other namespaces: however by establishing a DOI<sup>®</sup> namespace we provide a stable meaning with a DOI<sup>®</sup> definition of terms under this namespace. The DOI namespace must always be declared in the XML instance using the URI <http://www.doi.org/>.

## A6.5 DOI Resource Metadata Kernel XML schema - version 0.9

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.doi.org/2004/DOISchema"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:doi="http://www.doi.org/2004/DOISchema" elementFormDefault="qualified"
version="0.9">
  <xs:include schemaLocation="resourceKernelEnumerations.xsd"/>
  <xs:complexType name="resource">
    <xs:annotation>
      <xs:documentation>DOI Kernel Resource Metadata Version
0.9</xs:documentation>
```

```

</xs:annotation>
<xs:sequence>
  <xs:element name="DOI name" type="doi:doi">
    <xs:annotation>
      <xs:documentation>A DOI name that identifies a
resource. </xs:documentation>
    </xs:annotation>
    <xs:documentation>Any DOI name. </xs:documentation>
  </xs:element>
  <xs:element name="structuralType" type="doi:structuralType">
    <xs:annotation>
      <xs:documentation>The primary structural type of a
resource. </xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="modes">
    <xs:annotation>
      <xs:documentation>The principal sensory mode(s) in which a resource is
intended to be perceived. </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element name="mode" type="doi:mode" maxOccurs="3">
          <xs:annotation>
            <xs:documentation>A principal sensory mode in which a
resource is intended to be perceived. </xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="resourceTypes">
    <xs:annotation>
      <xs:documentation>The general type(s) of a
resource. </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element name="resourceType" type="doi:term"
maxOccurs="unbounded">
          <xs:annotation>
            <xs:documentation>The general type of a
resource. </xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="principalAgents">
    <xs:annotation>
      <xs:documentation>The principal agent(s) responsible for a resource,
normally but not necessarily its creator(s). </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element name="principalAgent" maxOccurs="unbounded">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="doi:agentType"/>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

```

```

    </xs:complexType>
  </xs:element>
  <xs:element name="resourceNames" minOccurs="0">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="resourceName" maxOccurs="unbounded">
          <xs:annotation>
            <xs:documentation>A name or title by which a resource is
known.</xs:documentation>
          </xs:annotation>
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="xs:string">
                <xs:attribute name="type"
type="doi:kernelResourceNameType" use="required"/>
                <xs:attribute name="primaryLanguage"
type="xs:language" use="optional"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="resourceIdentifiers" minOccurs="0">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="resourceIdentifier" maxOccurs="unbounded">
          <xs:annotation>
            <xs:documentation>An identifier other than the primary DOI
name applied to a resource.</xs:documentation>
          </xs:annotation>
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="xs:string">
                <xs:attribute name="type"
type="doi:kernelResourceIdentifierType" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:attribute name="version" type="xs:string" use="optional"/>
</xs:complexType>
<xs:complexType name="agentType">
  <xs:sequence>
    <xs:choice>
      <xs:sequence>
        <xs:element name="agentNames">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="agentName" maxOccurs="unbounded">
                <xs:annotation>
                  <xs:documentation>A name by which an agent is
known.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                  <xs:simpleContent>
                    <xs:extension base="xs:string">

```

```

        <xs:attribute name="type"
type="doi:kernelAgentNameType" use="required"/>
        </xs:extension>
        </xs:simpleContent>
        </xs:complexType>
        </xs:element>
        </xs:sequence>
        </xs:complexType>
</xs:element>
<xs:element name="agentIdentifiers" minOccurs="0">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="agentIdentifier"
maxOccurs="unbounded">
        <xs:annotation>
          <xs:documentation>An identifier of an
agent.</xs:documentation>
        </xs:annotation>
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:string">
              <xs:attribute name="type"
type="doi:kernelAgentIdentifierType" use="required"/>
            </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:sequence>
<xs:sequence>
  <xs:element name="agentIdentifiers">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="agentIdentifier"
maxOccurs="unbounded">
          <xs:annotation>
            <xs:documentation>An identifier of an
agent.</xs:documentation>
          </xs:annotation>
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="xs:string">
                <xs:attribute name="type"
type="doi:kernelAgentIdentifierType" use="required"/>
              </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:choice>
<xs:element name="agentRoles">
  <xs:annotation>
    <xs:documentation>The role(s) played an agent.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="agentRole" type="doi:term"
maxOccurs="unbounded">

```

```

        <xs:annotation>
          <xs:documentation>A role played by an
agent.</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:element name="kernelMetadata">
  <xs:annotation>
    <xs:documentation>DOI Kernel Metadata Declaration 0.9</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="registrationAgency" type="doi:doi">
        <xs:annotation>
          <xs:documentation>The DOI Registration Agency responsible for
issuing a Kernel Declaration.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="issueDate" type="xs:date">
        <xs:annotation>
          <xs:documentation>The Date on which the Kernel Declaration was
made.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="issueNumber" type="xs:unsignedInt">
        <xs:annotation>
          <xs:documentation>The sequence number of this Declaration in the
series of Kernel Declarations for this DOI</xs:documentation>
          <xs:documentation>First issue=1. If a Kernel Declaration for a specific
DOI name is re-issued, this number should be incremented by one.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="resources">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="resource" type="doi:resource"
maxOccurs="unbounded"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
</xs:schema>

```

## A6.6 DOI Resource Metadata Kernel XML schema enumerations – version 0.9

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.doi.org/2004/DOISchema"
xmlns:doi="http://www.doi.org/2004/DOISchema"
xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
version="0.9">
  <xs:simpleType name="DOI name">
    <xs:annotation>
      <xs:documentation>A DOI name issued under the authority of the International
DOI Foundation.</xs:documentation>
    </xs:annotation>

```

```

    <xs:restriction base="xs:string">
      <xs:pattern value="[^\.\/]+(\.[^\.\/]+)*\/.+"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="term">
    <xs:annotation>
      <xs:documentation>A Term in the iDD ontology.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:NMTOKEN"/>
  </xs:simpleType>
  <xs:simpleType name="structuralType">
    <xs:annotation>
      <xs:documentation>Structural types of a resource.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="doi:term">
      <xs:enumeration value="Abstraction">
        <xs:annotation>
          <xs:documentation>Of a resource which exists as a
concept.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="Performance">
        <xs:annotation>
          <xs:documentation>Of a resource which is expressed in a transient
form.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="Digital">
        <xs:annotation>
          <xs:documentation>Of a resource which is expressed in digital
form.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="Physical">
        <xs:annotation>
          <xs:documentation>Of a resource which is expressed in physical
form.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="Restricted">
        <xs:annotation>
          <xs:documentation>Of a resource which is described by a restricted DOI
Application profile.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="mode">
    <xs:annotation>
      <xs:documentation>Modes in which a resource may be
perceived.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="doi:term">
      <xs:enumeration value="Abstract">
        <xs:annotation>
          <xs:documentation>Of a resource which is not directly perceivable with
any of the five human senses.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="Audio">
        <xs:annotation>
          <xs:documentation>Of a resource which is principally intended to be
listened to.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>

```

```

    </xs:annotation>
  </xs:enumeration>
  <xs:enumeration value="Visual">
    <xs:annotation>
      <xs:documentation>Of a resource which is principally intended to be
looked at.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
  <xs:enumeration value="AudioVisual">
    <xs:annotation>
      <xs:documentation>Of a resource which is principally intended to be
looked at and listened to simultaneously.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
  <xs:enumeration value="Tangible">
    <xs:annotation>
      <xs:documentation>Of a resource which is principally intended to be
touched.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
  <xs:enumeration value="Restricted">
    <xs:annotation>
      <xs:documentation>Of a resource which is described by a restricted DOI
Application Profile.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="kernelResourceNameType">
  <xs:annotation>
    <xs:documentation>Types (e.g. PrimaryTitle, OriginalTitle, TranslatedTitle,
ChapterTitle), may be registered in the iDD by any RA.</xs:documentation>
  </xs:annotation>
  <xs:restriction base="doi:term">
    <xs:enumeration value="Name">
      <xs:annotation>
        <xs:documentation>A name of a resource.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="Title">
      <xs:annotation>
        <xs:documentation>A name of a created resource.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="PrincipalTitle">
      <xs:annotation>
        <xs:documentation>The Title by which a resource is mainly
known.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="AlternativeTitle">
      <xs:annotation>
        <xs:documentation>A Title other than the
PrincipalTitle.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="AbbreviatedTitle">
      <xs:annotation>
        <xs:documentation>A Title which is a shortened form of another
Title.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="Subtitle">

```

```

    <xs:annotation>
      <xs:documentation>A Title which is supplementary to another
Title.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
  <xs:enumeration value="FormerTitle">
    <xs:annotation>
      <xs:documentation>A Title by which a resource was once
known.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
  <xs:enumeration value="TranslatedTitle">
    <xs:annotation>
      <xs:documentation>A Title which is a translation of another
Title.</xs:documentation>
    </xs:annotation>
  </xs:enumeration>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="kernelResourceIdentifierType">
  <xs:restriction base="doi:term">
    <xs:enumeration value="DOI name">
      <xs:annotation>
        <xs:documentation>A DOI name issued under the authority of the
International DOI Foundation.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="ISBN">
      <xs:annotation>
        <xs:documentation>An International Standard Book Number, the ISO
Standard Identifier for books.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="ISSN">
      <xs:annotation>
        <xs:documentation>An International Standard Serial Number, the ISO
Standard Identifier for published Serials.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="ISTC">
      <xs:annotation>
        <xs:documentation>An International Standard Text Code, the ISO
Standard Identifier for textual works.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="PII"/>
    <xs:enumeration value="EAN13">
      <xs:annotation>
        <xs:documentation>A European Article Number.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="UPC">
      <xs:annotation>
        <xs:documentation>A Universal Product Code.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="EditionNumber">
      <xs:annotation>
        <xs:documentation>An identifier of a resource which denotes its
version.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="PartIdentifier">

```

```

        <xs:annotation>
            <xs:documentation>An identifier of a resource in relation to another
resource of which it is a part.</xs:documentation>
        </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="ProprietaryIdentiifier">
        <xs:annotation>
            <xs:documentation>An identifier which is not in public
use.</xs:documentation>
        </xs:annotation>
    </xs:enumeration>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="kernelAgentNameType">
    <xs:restriction base="doi:term">
        <xs:enumeration value="Name">
            <xs:annotation>
                <xs:documentation>A name by which an agent is
known.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="PrincipalName">
            <xs:annotation>
                <xs:documentation>The Name by which an agent is mainly
known.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="AlternativeName">
            <xs:annotation>
                <xs:documentation>A Name, other than the PrincipalName, by which an
agent is known.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="FormerName">
            <xs:annotation>
                <xs:documentation>A Name by which an agent was once
known.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="IndividualName">
            <xs:annotation>
                <xs:documentation>A Name of an agent that is is a
person.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="OrganizationName">
            <xs:annotation>
                <xs:documentation>A Name of an agent that is an
organization.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="kernelAgentIdentifierType">
    <xs:restriction base="doi:term">
        <xs:enumeration value="ProprietaryIdentifier">
            <xs:annotation>
                <xs:documentation>An identifier of an agent issued by an organization
for proprietary purposes.</xs:documentation>
            </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="CaeNumber">
            <xs:annotation>

```

```

        <xs:documentation>The CISAC Composer, Author and Publisher
(Compositeur, Auteur, Editeur) identifier.</xs:documentation>
    </xs:annotation>
</xs:enumeration>
</xs:restriction>
</xs:simpleType>
</xs:schema>

```

## A6.7 Example DOI Resource Metadata Kernel Declaration

```

<?xml version="1.0" encoding="UTF-8"?>
<kernelMetadata xmlns="http://www.doi.org/2004/DOISchema">
  <registrationAgency>10.1025/aDoiRegistrationAgency</registrationAgency>
  <issueDate>2004-03-13</issueDate>
  <issueNumber>1</issueNumber>
  <resources>
    <resource>
      <resource>
        <DOI>10.1025/abio.4372.9898</DOI name>
        <structuralType>Digital</structuralType>
        <modes>
          <mode>Visual</mode>
        </modes>
        <resourceTypes>
          <resourceType>JournalArticle</resourceType>
        </resourceTypes>
        <principalAgents>
          <principalAgent>
            <agentNames>
              <agentName type="IndividualName">Lincoln Smith</agentName>
            </agentNames>
            <agentRoles>
              <agentRole>author</agentRole>
            </agentRoles>
          </principalAgent>
          <principalAgent>
            <agentNames>
              <agentName type="IndividualName">Marsha
Grossman</agentName>
            </agentNames>
            <agentRoles>
              <agentRole>illustrator</agentRole>
            </agentRoles>
          </principalAgent>
        </principalAgents>
        <resourceNames>
          <resourceName type="Title" primaryLanguage="en">DRM in Streaming
Media</resourceName>
        </resourceNames>
        <resourceIdentifiers>
          <resourceIdentifier type="PII">S1031-5806(95)00403-
9</resourceIdentifier>
        </resourceIdentifiers>
      </resource>
    </resources>
  </kernelMetadata>

```