INTERNATIONAL STANDARD

ISO/IEC 21000-4

First edition
2006-04-01

AMENDMENT 1
2007-12-01

Information technology — Multimedia framework (MPEG-21) —

Part 4:
Intellectual Property Management and Protection Components

AMENDMENT 1: IPMP components base profile

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

Partie 4: Composants de gestion et de protection de propriété intellectuelle

AMENDEMENT 1: Profil de base des composants GPPI

Reference number
ISO/IEC 21000-4:2006/Amd.1:2007(E)

© ISO/IEC 2007

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

© ISO/IEC 2007 – All rights reserved

Not for Resale

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.

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

Amendment 1 to ISO/IEC 21000-4:2006 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 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Information technology — Multimedia framework (MPEG-21) —

Part 4:
Intellectual Property Management and Protection Components

AMENDMENT 1: IPMP components base profile

Add Clause 9:

9 Base Profile

9.2 Introduction

ISO/IEC 21000-4 Intellectual Property Management and Protection (IPMP) Components addresses the need for effective management and protection of intellectual property in the ISO/IEC 21000 MPEG-21 multimedia framework over heterogeneous access and delivery infrastructures. It represents a flexible and extensible framework for applying protection mechanisms to a Digital Item (DI). It purposely does not specify protection measures, keys, key management, trust management, encryption algorithms, certification infrastructures or other components. In its current form, the specification is designed to be applicable to a wide range of application areas [14][15].

Similarly to previously developed MPEG standards, we believe the utility of this part of ISO/IEC 21000 can be enhanced by the careful identification and development of specific profiles supporting functionality relevant to various user communities. Base Profile specifically aims at supporting use cases in widespread use in the area of commercial content distribution. Base Profile purposely provides a limited scope in order to facilitate the easier and lighter implementation in devices with limited computational/storage capabilities.

9.2 Application Areas

Base Profile provides sufficient functionality to support current and emerging practices for distribution of commercial content, with a special focus on entertainment content such as movies and music, while reducing the requirements on end devices (e.g. footprint, memory usage, computational power, storage). To this end, Base Profile will provide suitable protection capability for the simple applications such as music player application, video player, music player with karaoke capability, etc.

9.3 List of Tools

9.3.1 Requirements

Based on use-cases listed in Annex M and the capabilities in the MPEG-21 IPMP Components, the following is a list of detail required capabilities that shall be supported in Base Profile. These requirements later can be translated into some guidelines of rationale when selecting supported elements out of the complete set of MPEG-21 IPMP Components' elements.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

One important corollary derived from the use cases is that typically protection mechanisms are not applied independently, but rather a single mechanism (most likely incorporating several techniques, such as encryption, key management, digital signatures and/or watermarking, and with associated non-technical compliance enforcement methods) is used as an indivisible component. With this in mind, Base Profile can be greatly simplified by assuming that a single Tool will be used for any given DI. Nonetheless, Base Profile should allow for the same Tool to be applied multiple times within the same DI (e.g. to protect different resources) and for different Licenses to be applied to different elements.

Another important result from the use cases is that it is not necessary to support multiple levels of Signature. The use cases show that the user who assembles the DI also applies the protection. Therefore, digital signature on a parent element in the DI is sufficient to ensure integrity of its children. A related result is that the type of protection that is most likely to be applied to a License is a digital signature to ensure the integrity of the License, i.e. that it has not been tampered with. Therefore, it is not necessary in Base Profile to be able to signal governance of a License, beyond the capability of signing the parent element. Note that MPEG-21 IPMP Components is capable of supporting more flexible configurations, e.g. where the License is signed (or otherwise "governed") by one party, the Tool is signed by another party and the DI is assembled by yet another party, which is not in scope for Base Profile.

Finally, in order to facilitate processing of these Digital Items in resource-constrained terminals (such as portable devices with limited memory, processing power, connectivity and power consumption), Base Profile limits the ability to specify Tools to either an ID or a reference to the location where the Tool can be downloaded. (Note that this excludes the ability to specify Tools inline, which is consistent with the assumptions that, in general, Tools will be relatively complex.) An ID can be used by the terminal to determine if that capability is already supported. Loading of Tools specified through a reference is assumed to be through an out-of-band mechanism.

9.3.2 Selection Rationale

Base Profile restricts the occurrence of some elements from the complete MPEG-21 IPMP Components' elements. The guidelines for the restrictions are as follow:

1. Base Profile is designed to maintain the capability to express the protected Digital Item.
2. Base Profile is designed to reduce the requirement on end devices (e.g. device footprint, memory usage, computational power, storage); thus, the following properties are restricted:
    a. Base Profile is designed to carry one protection tool in one document.
    b. Base Profile is designed to have no recursion. Recursion may consume more memory and computing power. Having recursion capability while carrying only one tool is redundant as protecting a single resource with same tool many times gives no additional protection effect.
    c. Base Profile is designed to have no duplication of elements in many locations. For elements that can be inserted in different locations, a suitable place among the current existing ones should be chosen to ease the implementation while not sacrificing the feature(s) offered by that element.
3. For simplicity, tool is assumed to be ready for use in the terminal. The procedure to acquire and/or install the tool in the terminal is out of scope of Base Profile.
4. Base Profile is designed to be simple for transfer. This requires the XML instance of Base Profile should be as small and compact as possible. For example, rather than being able to carry the tool binary representation in the XML document (with base64 encoding format), it is better to just carry reference to it.

9.3.3 IPMP DIDL

Base Profile maintains the full capability to express the protected DI (guideline no. 1); therefore, it shall include all the elements in the IPMP Digital Item Declaration Language (DIDL) schema. These elements taken together are a Representation of the Digital Item Declaration (DID) model that allows for inclusion of governance information (per guideline 1 in subclause 9.3.2).

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

9.3.4 IPMP General Information Descriptor

Base Profile shall include the root element IPMPGeneralInfoDescriptor as defined in Clause 8. It shall:

- Include ToolList element
- Optionally include LicenseCollection element. It may contain any number of RightsDescriptor elements (in case there are multiple assets in the digital item), although in most instances a single RightsDescriptor element is likely to be used. The RightsDescriptor in Base Profile excludes the possibility of having an IPMPInfoDescriptor child (per guideline 2.b)
- Optionally include Signature element. If present, it is sufficient to ensure the integrity of the children elements.

The ToolList element shall:

- Include at most one instance of ToolDescription (per guideline 2.a). Note that Tools to be used in IPMPInfoDescriptor can only reference elements in ToolList; this ensures that only a single Tool can be defined for any given DI.
- Provide no support for Signature (per guideline 2.c).

The ToolDescription element shall:

- Include IPMPToolID element
- Optionally include Remote element but without Signature element (per guideline 2.c)
- Provide no support of MemberOf element and its children (per guideline 2.a)
- Provide no support for Inline tool definition (per guideline 4)
- Provide no support for ConfigurationSettings (per guideline 3)
- Provide no support for RightsDescriptor. RightsDescriptor elements are carried all together under the LicenseCollection element (per guideline 2.c)
- Provide no support for Signature (per guideline 2.c)

9.3.5 IPMP Information Descriptor

Base Profile shall include the root element IPMPInfoDescriptor but with the following constraints:

- Support for (at most) a single Tool
- No support for RightsDescriptor (no need to specify governance over the Tool itself). The RightsDescriptor elements are collected and expressed under the LicenseCollection element (per guideline 2.c)
- The element dsig:Signature remains optional.

The Tool element shall have the following constraint:

- No attributes are needed. Since there is at most one Tool, order is no longer relevant (per guideline 2b).
- No support for ToolBaseDescription. All tool definition is carried in the ToolList while the Tool element will only refer to it (per guideline 2.c)

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

— Include a ToolRef element (per guideline 2.c)

— Optionally support the InitializationSettings element. However, there will be no support for ToolBaseDescription (no recursion per guideline 2.b). The only supported child element shall be InitializationData.

— No support for RightsDescriptor (per guideline 2.c)

— No support for Signature (per guideline 2.c)

9.4 Profile Definition

9.4.1 Namespaces

Throughout this document, Qualified Names are written with a namespace prefix followed by a colon followed by the local part of the Qualified Name.

For clarity, throughout this document, consistent namespace prefixes are used. Table 2 gives these prefixes and the corresponding namespace.

Table 2 — Mapping of prefixes to namespaces in examples and text

Prefix	Name	Corresponding namespace
ipmpdidl	IPMP DIDL	urn:mpeg:mpeg21:2004:01-IPMPDIDL-NS
ipmpinfo	IPMP Information	urn:mpeg:mpeg21:2004:01-IPMPINFO-NS
didl	DIDL	urn:mpeg:mpeg21:2002:02-DIDL-NS
didmodel	DIDL Model	urn:mpeg:mpeg21:2002:02-DIDMODEL-NS
dii	Digital Item Identifier (DII)	urn:mpeg:mpeg21:2002:01-DII-NS
r	Rights Expression Language (REL) Core	urn:mpeg:mpeg21:2003:01-REL-R-NS
xsd	XMLSchema	http://www.w3.org/2001/XMLSchema
xsi	XMLSchema Instance	http://www.w3.org/2001/XMLSchema-instance
dsig	XML digital signature core	http://www.w3.org/2000/09/xmldsig#

9.4.2 IPMP DIDL

IPMP DIDL is included as specified in clause 6 without any restrictions.

9.4.3 IPMP General Information Descriptor Representation

The subset of elements of the IPMP General Information Descriptor schema (see clause 8) and any restrictions are listed in subclause 9.3.2.

Table 3 list the elements of IPMP General Information Descriptor of Base Profile.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
© ISO/IEC 2007 – All rights reserved
Not for Resale

Table 3 — IPMP General Information Base Profile elements

Element/Child Element	Restrictions
ipmpinfo:IPMPGeneralInfoDescriptor	As defined in 8.3.1.
ipmpinfo:ToolList	Identifies the IPMP Tool required to process and unprotect the object. Restricted to contain a single IPMP Tool.
ipmpinfo:LicenseCollection	As defined in 8.5.
dsig:Signature	As defined in 8.6.
ipmpinfo:ToolList	An ipmpinfo:ToolList is restricted to include the following child element: a single ipmpinfo:ToolDescription
ipmpinfo:ToolDescription	Restricted to at most one occurrence from unbounded occurrences.
ipmpinfo:ToolDescription	This element is restricted to include the following child elements only: ipmpinfo:IPMPToolID, and an optional ipmpinfo:Remote.
ipmpinfo:IPMPToolID	As defined in 8.4.4.3.
ipmpinfo:Remote	Contains the remote location from where the tool can be retrieved.
@localID	As defined in 8.4.4.1.
ipmpinfo:Remote	This element is restricted to include no child elements.
@ref	As defined in 7.4.4.6.1.
ipmpinfo:RightsDescriptor	This element is restricted to include the following child elements only: one of ipmpinfo:License, or ipmpinfo:LicenseReference.
ipmpinfo:License	As defined in 7.4.7.3.
ipmpinfo:LicenseReference	As defined in 7.4.7.4.

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Figure 3 presents a graphical overview of the profiled IPMP Information Descriptor schema elements.

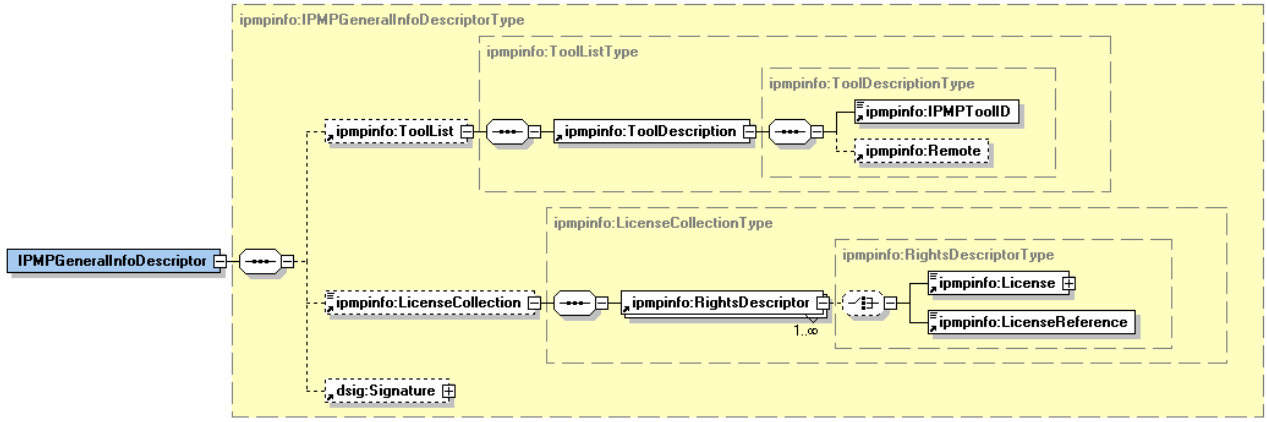

Figure 3 — Base Profile IPMP General Information Descriptor elements

9.4.4 IPMP Information Descriptor Representation

The subset of elements of the IPMP Information Descriptor schema (see Clause 7) and any restrictions are listed in subclause 9.3.2.

Table 4 list the elements of the IPMP Information Descriptor of Base Profile.

Table 4 — IPMP Information Base Profile elements

Element/Child Element	Restrictions
ipmpinfo:IPMPInfoDescriptor	An ipmpinfo:IPMPInfoDescriptor is restricted to contain the following child elements: at most one ipmpinfo:Tool, and an optional dsig:Signature.
ipmpinfo:Tool	Restricted to at most one occurrence from unbounded occurrences.
dsig:Signature	As defined in 7.6.
ipmpinfo:Tool	An ipmpinfo:Tool is restricted to include the following child elements: an ipmpinfo:ToolRef, and an optional ipmpinfo:InitializationSettings.
ipmpinfo:ToolRef	As defined in 7.4.5.
ipmpinfo:InitializationSettings	Detailed settings to initialize the tool.
ipmpinfo:InitializationSettings	This element is restricted to include the following child element only: ipmpinfo:InitializationData.
ipmpinfo:InitializationData	As defined in 7.4.6.4.

© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Figure 4 presents a graphical overview of the profiled IPMP Information Descriptor schema elements.

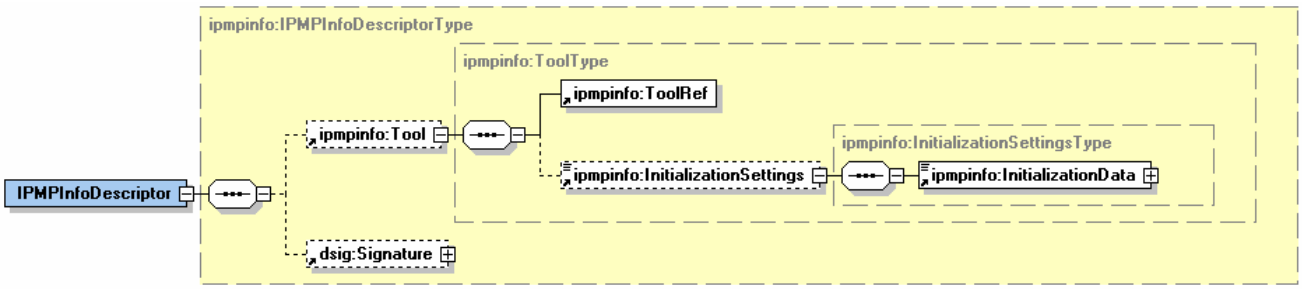

Figure 4 — Base Profile IPMP Information Descriptor elements

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Add Annex I:

Annex I
(normative)

IPMP DIDL Schema

The XML Schema for the profile elements and types of IPMP DIDL

```
<?xml version="1.0"?>
<!--=======================================-->
<!--=====Schema for IPMP DIDL Types=====-->
<!--=======================================-->
<schema targetNamespace="urn:mpeg:mpeg21:2004:01-IPMPDIDL-NS" elementFormDefault="qualified"
    attributeFormDefault="unqualified" version="0.01" xmlns="http://www.w3.org/2001/XMLSchema"
    xmlns:didmodel="urn:mpeg:mpeg21:2002:02-DIDMODEL-NS" xmlns:ipmpdidl="urn:mpeg:mpeg21:2004:01-
IPMPDIDL-NS">
    <import schemaLocation="didmodel.xsd" namespace="urn:mpeg:mpeg21:2002:02-DIDMODEL-NS"/>
    <import schemaLocation="didl.xsd" namespace="urn:mpeg:mpeg21:2002:02-DIDL-NS"/>
    <!--============================================================
             All element types corresponding to the DID model contain:
            (i)  a maximum of one ipmpdidl:Identifier element, into which an appropriate identifier
for the protected Representation may be placed
            (ii) one ipmpdidl:Info element, into which information about the governance is placed
            (iii) one ipmpdidl:Contents element, into which the governed Contents is placed
    ============================================================-->

    <element name="Container" type="ipmpdidl:ContainerType" substitutionGroup="didmodel:Container"/>
    <complexType name="ContainerType">
        <complexContent>
            <extension base="didmodel:ContainerType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Item" type="ipmpdidl:ItemType" substitutionGroup="didmodel:Item"/>
    <complexType name="ItemType">
        <complexContent>
            <extension base="didmodel:ItemType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Descriptor" type="ipmpdidl:DescriptorType"
substitutionGroup="didmodel:Descriptor"/>
    <complexType name="DescriptorType">
        <complexContent>
            <extension base="didmodel:DescriptorType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Statement" type="ipmpdidl:StatementType" substitutionGroup="didmodel:Statement"/>
    <complexType name="StatementType" mixed="true">
        <complexContent>
            <extension base="didmodel:StatementType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Component" type="ipmpdidl:ComponentType" substitutionGroup="didmodel:Component"/>
    <complexType name="ComponentType">
        <complexContent>
            <extension base="didmodel:ComponentType">
```


Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
© ISO/IEC 2007 – All rights reserved
Not for Resale

```
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Anchor" type="ipmpdidl:AnchorType" substitutionGroup="didmodel:Anchor"/>
    <complexType name="AnchorType">
        <complexContent>
            <extension base="didmodel:AnchorType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Fragment" type="ipmpdidl:FragmentType" substitutionGroup="didmodel:Fragment"/>
    <complexType name="FragmentType" mixed="true">
        <complexContent>
            <extension base="didmodel:FragmentType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Condition" type="ipmpdidl:ConditionType" substitutionGroup="didmodel:Condition"/>
    <complexType name="ConditionType">
        <complexContent>
            <extension base="didmodel:ConditionType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Choice" type="ipmpdidl:ChoiceType" substitutionGroup="didmodel:Choice"/>
    <complexType name="ChoiceType">
        <complexContent>
            <extension base="didmodel:ChoiceType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Selection" type="ipmpdidl:SelectionType" substitutionGroup="didmodel:Selection"/>
    <complexType name="SelectionType">
        <complexContent>
            <extension base="didmodel:SelectionType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Resource" type="ipmpdidl:ResourceType" substitutionGroup="didmodel:Resource"/>
    <complexType name="ResourceType" mixed="true">
        <complexContent mixed="true">
            <extension base="didmodel:ResourceType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <element name="Annotation" type="ipmpdidl:AnnotationType"
substitutionGroup="didmodel:Annotation"/>
    <complexType name="AnnotationType">
        <complexContent>
            <extension base="didmodel:AnnotationType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
```

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

```
    </complexType>
    <element name="Assertion" type="ipmpdidl:AssertionType" substitutionGroup="didmodel:Assertion"/>
    <complexType name="AssertionType">
        <complexContent>
            <extension base="didmodel:AssertionType">
                <sequence>
                    <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
    <!-- elements from here onward are unique to the IPMP DIDL Representation-->
    <group name="IPMPDIDLChildGroup">
        <sequence>
            <element ref="ipmpdidl:Identifier" minOccurs="0"/>
            <element ref="ipmpdidl:Info"/>
            <element ref="ipmpdidl:ContentInfo" minOccurs="0"/>
            <element ref="ipmpdidl:Contents"/>
        </sequence>
    </group>
    <element name="Contents">
        <complexType mixed="true">
            <sequence>
                <any namespace="##any" processContents="lax" minOccurs="0"/>
            </sequence>
            <attribute name="ref" type="anyURI"/>
        </complexType>
    </element>
    <element name="Info">
        <complexType mixed="true">
            <sequence>
                <any namespace="##any" processContents="lax" minOccurs="0"/>
            </sequence>
        </complexType>
    </element>
    <element name="Identifier">
        <complexType mixed="true">
            <sequence>
                <any namespace="##any" processContents="lax" minOccurs="0"/>
            </sequence>
        </complexType>
    </element>
    <element name="ContentInfo">
        <complexType mixed="true">
            <sequence>
                <any namespace="##any" processContents="lax" minOccurs="0"/>
            </sequence>
        </complexType>
    </element>
    <element name="ProtectedAsset" type="ipmpdidl:ProtectedAssetType"/>
    <complexType name="ProtectedAssetType">
        <sequence>
            <group ref="ipmpdidl:IPMPDIDLChildGroup"/>
        </sequence>
        <attribute name="mimeType" type="string" use="required"/>
    </complexType>
</schema>
```


© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Add Annex J:

Annex J
(normative)

IPMP General Information Schema

The XML Schema for the profile elements and types of IPMP General Information

```
<?xml version="1.0"?>
<schema targetNamespace="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
xmlns="http://www.w3.org/2001/XMLSchema" xmlns:ipmpinfo="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="0.01">
    <import namespace="http://www.w3.org/2000/09/xmldsig#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmldsig-core-20020212/xmldsig-core-schema.xsd"/>
    <include schemaLocation="ipmpinfo.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS" schemaLocation="rel-r.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2002:01-DII-NS" schemaLocation="dii.xsd"/>
    <element name="IPMPGeneralInfoDescriptor" type="ipmpinfo:IPMPGeneralInfoDescriptorType"/>
    <complexType name="IPMPGeneralInfoDescriptorType">
        <sequence>
            <element ref="ipmpinfo:ToolList" minOccurs="0"/>
            <element ref="ipmpinfo:LicenseCollection" minOccurs="0"/>
            <element ref="dsig:Signature" minOccurs="0"/>
            <!--Signature for the IPMPGeneralInfoDescriptor element and children -->
        </sequence>
    </complexType>
    <element name="ToolList" type="ipmpinfo:ToolListType"/>
    <complexType name="ToolListType">
        <sequence>
            <element ref="ipmpinfo:ToolDescription" maxOccurs="1"/>
        </sequence>
    </complexType>
    <element name="ToolDescription" type="ipmpinfo:ToolDescriptionType"/>
    <complexType name="ToolDescriptionType">
        <sequence>
            <element ref="ipmpinfo:IPMPToolID"/>
            <element ref="ipmpinfo:Remote" minOccurs="0"/>
        </sequence>
        <attribute name="localID" type="ID" use="required"/>
    </complexType>
    <element name="LicenseCollection" type="ipmpinfo:LicenseCollectionType"/>
    <complexType name="LicenseCollectionType" mixed="true">
        <sequence>
            <element ref="ipmpinfo:RightsDescriptor" maxOccurs="unbounded"/>
        </sequence>
    </complexType>
</schema>
```

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Add Annex K:

Annex K
(normative)

IPMP Information Schema

The XML Schema for the profile elements and types of IPMP Information

```
<?xml version="1.0"?>
<schema targetNamespace="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
xmlns="http://www.w3.org/2001/XMLSchema" xmlns:ipmpinfo="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="0.01">
    <import namespace="http://www.w3.org/2000/09/xmldsig#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmldsig-core-20020212/xmldsig-core-schema.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS" schemaLocation="rel-r.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2002:01-DII-NS" schemaLocation="dii.xsd"/>
    <element name="IPMPInfoDescriptor" type="ipmpinfo:IPMPInfoDescriptorType"/>
    <complexType name="IPMPInfoDescriptorType">
        <sequence>
            <element ref="ipmpinfo:Tool" minOccurs="0" maxOccurs="1"/>
            <element ref="dsig:Signature" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="Tool" type="ipmpinfo:ToolType"/>
    <complexType name="ToolType">
        <sequence>
            <element ref="ipmpinfo:ToolRef"/>
            <element ref="ipmpinfo:InitializationSettings" minOccurs="0"/>     </sequence>
    </complexType>
    <element name="ToolRef" type="ipmpinfo:ToolRef"/>
    <complexType name="ToolRef">
        <attribute name="localidref" type="IDREF" use="required"/>
    </complexType>
    <element name="IPMPToolID" type="anyURI"/>
    <element name="Remote" type="ipmpinfo:RemoteType"/>
    <complexType name="RemoteType">
        <attribute name="ref" type="anyURI"/>
    </complexType>
    <element name="RightsDescriptor" type="ipmpinfo:RightsDescriptorType"/>
    <complexType name="RightsDescriptorType">
        <choice minOccurs="0">
            <element ref="ipmpinfo:License"/>
            <element ref="ipmpinfo:LicenseReference"/>
        </choice>
    </complexType>
    <element name="License" type="ipmpinfo:LicenseType"/>
    <complexType name="LicenseType" mixed="true">
        <sequence>
            <any namespace="##any" processContents="lax" minOccurs="0"/>
        </sequence>
    </complexType>
    <element name="LicenseReference" type="ipmpinfo:LicenseReferenceType"/>
    <complexType name="LicenseReferenceType">
        <simpleContent>
            <extension base="anyURI"/>
        </simpleContent>
    </complexType>
    <element name="InitializationSettings" type="ipmpinfo:InitializationSettingsType"/>
    <complexType name="InitializationSettingsType" mixed="true">
        <sequence>
            <element ref="ipmpinfo:InitializationData"/>
        </sequence>
    </complexType>
    <element name="InitializationData" type="ipmpinfo:InitializationDataType"/>
    <complexType name="InitializationDataType" mixed="true">
        <sequence>
            <any namespace="##any" processContents="lax" minOccurs="0"/>
        </sequence>
    </complexType>
</schema>
```


© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Add Annex L:

Annex L
(informative)

Usage Examples

L.1 Protecting a Single Item

```
<DIDL xmlns="urn:mpeg:mpeg21:2002:02-DIDL-NS"
      xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS"
      xmlns:ipmpdidl="urn:mpeg:mpeg21:2004:01-IPMPDIDL-NS"
      xmlns:ipmpinfo="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
      xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
      xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
      xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Container>
    <Descriptor>
      <Statement mimeType="text/xml">
        <ipmpinfo:IPMPGeneralInfoDescriptor>
          <ipmpinfo:ToolList>
            <ipmpinfo:ToolDescription localID="TheTool">
             <ipmpinfo:IPMPToolID>urn:mpegRA:mpeg21:IPMP:ABC003:77:29</ipmpinfo:IPMPToolID>
            </ipmpinfo:ToolDescription>
          </ipmpinfo:ToolList>
          <ipmpinfo:LicenseCollection>
            <ipmpinfo:RightsDescriptor>
              <ipmpinfo:License>
                <r:license>
              …
                </r:license>
              </ipmpinfo:License>
            </ipmpinfo:RightsDescriptor>
          </ipmpinfo:LicenseCollection>
        </ipmpinfo:IPMPGeneralInfoDescriptor>
      </Statement>
    </Descriptor>
    <ipmpdidl:Item>
      <ipmpdidl:Identifier>
        <dii:Identifier>IPMPid0001</dii:Identifier>
      </ipmpdidl:Identifier>
      <ipmpdidl:Info>
        <ipmpinfo:IPMPInfoDescriptor>
          <ipmpinfo:Tool>
            <ipmpinfo:ToolRef localidref="TheTool"/>
          </ipmpinfo:Tool>
        </ipmpinfo:IPMPInfoDescriptor>
      </ipmpdidl:Info>
      <ipmpdidl:Contents>3E674F632A56BD56...</ipmpdidl:Contents>
    </ipmpdidl:Item>
  </Container>
</DIDL>
```

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

L.2 Protecting Several Items in the Same DIDL Document

```
<DIDL xmlns="urn:mpeg:mpeg21:2002:02-DIDL-NS"
      xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS"
      xmlns:ipmpdidl="urn:mpeg:mpeg21:2004:01-IPMPDIDL-NS"
      xmlns:ipmpinfo="urn:mpeg:mpeg21:2004:01-IPMPINFO-NS"
      xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
      xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
      xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Container>
    <Descriptor>
      <Statement mimeType="text/xml">
        <ipmpinfo:IPMPGeneralInfoDescriptor>
          <ipmpinfo:ToolList>
            <ipmpinfo:ToolDescription localID="TheTool">
             <ipmpinfo:IPMPToolID>urn:mpegRA:mpeg21:IPMP:ABC003:77:29</ipmpinfo:IPMPToolID>
            </ipmpinfo:ToolDescription>
          </ipmpinfo:ToolList>
          <ipmpinfo:LicenseCollection>
            <ipmpinfo:RightsDescriptor>
              <!-- License information for first Item -->
              <ipmpinfo:License>
                <r:license>
              …
                </r:license>
              </ipmpinfo:License>
            </ipmpinfo:RightsDescriptor>
            <ipmpinfo:RightsDescriptor>
              <!-- License information for second Item -->
              <ipmpinfo:License>
                <r:license>
              …
                </r:license>
              </ipmpinfo:License>
            </ipmpinfo:RightsDescriptor>
          </ipmpinfo:LicenseCollection>
        </ipmpinfo:IPMPGeneralInfoDescriptor>
      </Statement>
    </Descriptor>
    <ipmpdidl:Item>
      <ipmpdidl:Identifier>
        <dii:Identifier>IPMPid0001</dii:Identifier>
      </ipmpdidl:Identifier>
      <ipmpdidl:Info>
        <ipmpinfo:IPMPInfoDescriptor>
          <ipmpinfo:Tool>
            <ipmpinfo:ToolRef localidref="TheTool"/>
          </ipmpinfo:Tool>
        </ipmpinfo:IPMPInfoDescriptor>
      </ipmpdidl:Info>
      <ipmpdidl:Contents>3E674F632A56BD56...</ipmpdidl:Contents>
    </ipmpdidl:Item>
    <ipmpdidl:Item>
      <ipmpdidl:Identifier>
        <dii:Identifier>IPMPid0002</dii:Identifier>
      </ipmpdidl:Identifier>
      <ipmpdidl:Info>
        <ipmpinfo:IPMPInfoDescriptor>
          <ipmpinfo:Tool>
            <ipmpinfo:ToolRef localidref="TheTool"/>
          </ipmpinfo:Tool>
        </ipmpinfo:IPMPInfoDescriptor>
      </ipmpdidl:Info>
      <ipmpdidl:Contents>A56BD5A63E6654F632...</ipmpdidl:Contents>
    </ipmpdidl:Item>
  </Container>
</DIDL>
```


© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Add Annex M:

Annex M
(informative)

Use-Case Scenarios

M.1 Introduction

The use cases that follow are presented here to illustrate the motivation for MPEG-21 IPMP Components Base Profile, rather than as an exhaustive list of all possible uses for this profile.

As mentioned in subclause 9.2, the purpose of Base Profile is to provide sufficient functionality to support current and emerging practices for distribution of commercial content, with a special focus on entertainment content such as movies and music, while reducing the requirements on end devices (e.g. footprint, memory usage, computational power, storage)

M.2 Service Provider Applies Protection

In current business practices, the service provider distributing the content typically applies the protection in order to enforce the appropriate business models. This is the case with popular music download services as well as online move rentals and subscription systems. This use case also reflects protected broadcasting models such as Conditional Access.

In these scenarios, the service provider and the rights owner (e.g. record label, film studio) usually have a contractual arrangement that manages trust through non-technical means, and thus content is delivered from the rights owner to the service provider in unprotected form.

Content packaging is also typically handled by the service provider. This may involve combining media resources (e.g. a compressed file or files) with content metadata, selecting usage permissions, applying protection mechanisms and collecting everything in a single file that can be processed by target devices.

While these files of packaged content may be arbitrarily complex in theory, the most widespread practice is to provide one protected resource accompanied with unprotected basic metadata and optionally some ancillary (also unprotected) material, such as album cover art images in the case of music. In this practice, a single content protection mechanism is applied to protect the resource. This content protection mechanism typically represents a combination of technical (and in some cases legal) means for protecting content. In some instances, the protection mechanism may include its own set of rights; alternatively, rights can be expressed in the format, possibly with appropriate mechanisms to protect the integrity of the rights expression.

M.3 Producer Applies Protection

It has been argued that an emerging business model is for producers to apply protection mechanisms as part of the production process, rather than relying on service providers to apply such protection. With the possible exception of vertically-integrated producers-service providers, we have not seen evidence that this is a widespread practice for the type of content in scope of this profile.

Nevertheless, Base Profile should accommodate this possibility, with similar assumptions as were made in previous use case (service provider applies protection) regarding the complexity of the packaged content.

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

M.4 Consumer Acquires Content

When a consumer gets access to a piece of content, the end user equipment can parse the file and determine all the relevant protection information, including the protection mechanism (if any) that has been applied as well as other relevant information such as metadata and rights (if present).

In the more common case, when a consumer acquires content, the content already includes the allowed usage permissions. Frequently, the end user equipment will have built-in support for the protection mechanism that is used in the content and can immediately process the content. Occasionally, however, the capability to support the protection mechanism may need to be downloaded, using information provided in the packaged content.

Some business models call for distribution of content with limited or no rights, with the possibility of acquiring enhanced rights at a later point in time. While there are different models for this (e.g. connecting back to the service provider from where content was acquired initially, going through a third-party or using a clearing house), all have in common the ability to contact a URL for rights acquisition.

Payment systems can be very complex and in some cases may be tied to the content protection mechanism being used. For these reasons, handling of payments shall be considered to be outside the scope of Base Profile.

M.5 Playback

At the time of playback (assuming that rights have already been acquired), the user's device must process the Digital Item and access resources that are included in the DI, including protected assets. This is sometimes referred to as "un-protecting the Digital Item", although this terminology may be misleading: the assets should not be saved (or otherwise accessible by un-trusted components) in unprotected form at any time.

Based on the use-cases above, the following is a list of detailed requirements that shall be supported in the Base Profile.

One important corollary derived from the use cases is that typically protection mechanisms are not applied independently, but rather a single mechanism (most likely incorporating several techniques, such as encryption, key management, digital signatures and/or watermarking, and with associated non-technical compliance enforcement methods) is used as an indivisible component. With this in mind, **Base Profile can be greatly simplified by assuming that a single Tool will be used for any given Digital Item. Nonetheless, Base Profile should allow for the same Tool to be applied multiple times within the same DI (e.g. to protect different resources) and for different Licenses to be applied to different elements**.

Another important result from the use cases is that it is not necessary to support multiple levels of Signature. The use cases show that the user who assembles the DI also applies the protection. Therefore, the digital signature on a parent element is sufficient to ensure integrity of its children. A related result is that the type of protection that is most likely to be applied to a License is a digital signature to ensure the integrity of the License, i.e. that it has not been tampered with. **Therefore, it is not necessary in Base Profile to be able to signal governance of a License, beyond the capability of signing the parent element.**[1)]

Finally, in order to facilitate processing of these Digital Items in resource-constrained terminals (such as portable devices with limited memory, processing power, connectivity and power consumption), **Base Profile limits the ability to specify Tools to either an ID or a reference to the location where the Tool can be downloaded.** (Note that this excludes the ability to specify Tools inline, which is consistent with the assumptions that, in general, Tools will be relatively complex.) An ID can be used by the terminal to determine if that capability is already supported. Loading of Tools specified through a reference is assumed to be through out-of-band mechanisms.

---

1) By contrast, the full specification allows for more flexible configurations, e.g. where the License is signed (or otherwise "governed") by one party, the Tool is signed by another party and the DI is assembled by yet another party, which is not in scope for this Base Profile.

© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Add the following to the Bibliography:

[14] ISO/IEC JTC1/SC 29 WG 11 N 4671, Procedure to Develop Profiles and Levels, October 2005

[15] ISO/IEC JTC1/SC 29 WG 11 N 6389, Requirements for MPEG-21 IPMP, March 2004, Munich, Germany

© ISO/IEC 2007 – All rights reserved

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ICS 35.040

Price based on 17 pages

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2007 – All rights reserved
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale