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Information technology — Multimedia framework (MPEG-21) —

Part 5: Rights Expression Language

AMENDMENT 1: MAM (Mobile And optical Media) profile

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

Partie 5: Langage d'expression des droits

AMENDEMENT 1: Profil MAM ("Mobile And optical Media")

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Foreword

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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 21000-5:2004 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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Information technology — Multimedia framework (MPEG-21) —

Part 5:
Rights Expression Language

AMENDMENT 1: MAM (Mobile And optical Media) profile

Insert two new clauses 10 and 11 as follows:

10 Additional Extensions

10.1 General

This clause lists extensions of the REL.

The REL (Rights Expression Language) defined in the previous clauses and Annexes A through J is a comprehensive, flexible and domain-agnostic rights language that can be used for a wide spectrum of applications. However, in order to meet specific needs on the REL from, for example, an ecosystem (e.g., electronic books or mobile devices), an application (e.g., media streaming), a function (e.g., certificating and attesting assertions), or a region (e.g., North America, Europe or Asia), the entire REL may need to be restricted to some profiles for the purposes of optimization and interoperability in developing and deploying systems, applications, components and devices. Here, a profile here represents a subset of the REL types, elements and attributes (with any specified syntactic, semantic and processing restrictions), possibly together with some further extensions to the REL types and some newly introduced elements and attributes, all subject to maintaining compliance to the specification of the REL.

10.2 Multimedia Extension One

10.2.1 General

This subclause specifies an additional extension, called the “multimedia extension one”, of the REL specified in the previous clauses.

10.2.2 Normative Namespace

The XML namespace for the extension types and new elements and attributes introduced in the REL multimedia extension one shall be `urn:mpeg:mpeg21:2005:01-REL-M1X-NS`, and this namespace is normative. Here, the `01` represents a serial number that is expected to change as this extension evolves.

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10.2.3 Namespace Prefixes

For convenience, this extension uses shorthand namespace prefixes when referring to XML elements and types. The actual prefix used is not important as long as the namespace URI is correct. The prefixes used in this extension are given in Table AMD1.1.

Table AMD1.1 — Prefixes of XML Schemas

Prefix	Name	Namespace
`r`	REL Core	`urn:mpeg:mpeg21:2003:01-REL-R-NS`
`sx`	REL Standard Extension	`urn:mpeg:mpeg21:2003:01-REL-SX-NS`
`mx`	REL Multimedia Extension	`urn:mpeg:mpeg21:2003:01-REL-MX-NS`
`dsig`	XML Digital Signature	`http://www.w3.org/2000/09/xmldsig#`
`xenc`	XML Encryption	`http://www.w3.org/2001/04/xmlenc#`
`m1x`	REL Multimedia Extension One	`urn:mpeg:mpeg21:2005:01-REL-M1X-NS`

10.2.4 Defintion of Multimedia Extension One

This subclause defines the multimedia extension one to the REL. The syntax and the semantics of the types and elements in the multimedia extension one are presented here. The XML schema for the extension elements and types is listed in Annex L.

10.2.4.1 Principal Extension Elements

10.2.4.1.1 IdentityHolder

10.2.4.1.1.1 Informative Description

The `m1x:identityHolder` element is an extension element of the type `r:Principal` defined in the REL Core. It identifies the principal who is the holder of the specified identity possibly in some identification system. The optional `m1x:idSystem` child element of the `xsd:anyURI` type is used to indicate the identification system. The `m1x:idValue` child element, which can be either character content or element content from any namespace, is used to contain the identifier value of the identity.

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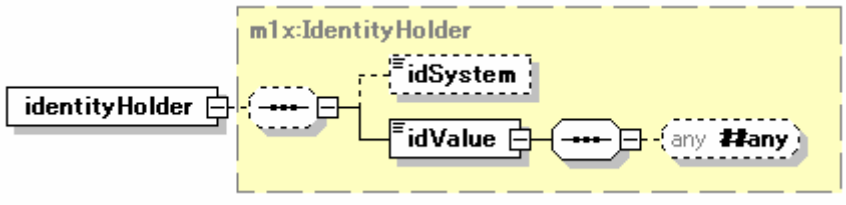

Figure AMD1.1 — `m1x:identityHolder` Principal

The following example specifies a principal as the holder of an International Mobile Subscriber Identifier.

```
<r:grant>
    <m1x:identityHolder>
        <idSystem>urn:acme:imsi</idSystem>
        <idValue>IMSI:2232111123</idValue>
    </m1x:identityHolder>
    <mx:play/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
    </r:digitalResource>
</r:grant>
```

In the above example, the principal identified by `m1x:identityHolder` is granted the right to play the resource specified in `r:digitalResource`.

The types of the `m1x:identityHolder` element and the `m1x:idValue` child element are defined as extensions of the `r:LicensePart` type. Consequently, both `m1x:identityHolder` and `m1x:idValue` can be specified by variables. The following example is like the example above, except the principal is a holder of any, instead of a particular, International Mobile Subscriber Identifier.

```
<r:grant>
    <r:forAll varName="imsiIdentifier"/>
    <m1x:identityHolder>
        <idSystem>urn:acme:imsi</idSystem>
        <idValue varRef="imsiIdentifier"/>
    </m1x:identityHolder>
    <mx:play/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
    </r:digitalResource>
</r:grant>
```

10.2.4.1.1.2 Normative Specification

Let p be a `m1x:IdentityHolder`. If p`/m1x:idValue` has a child element, then p`/m1x:idValue` identifies that system entity that possesses the identifier indicated by that child element. Otherwise, p`/m1x:idValue` identifies that system entity that possesses the identifier indicated by the value of p`/m1x:idValue`. In either case, the identifier belongs to the identification system indicated by the URI value of p`/m1x:idSystem` when the p`/m1x:idSystem` child element is present.

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10.2.4.2 Right Extension Elements

10.2.4.2.1 GovernedCopy

10.2.4.2.1.1 Informative Description

This element represents the right to copy the resource and at the same time to result in certain rights being associated to the copied resource. The optional attribute `@m1x:governanceRule` of type `QName` indicates the name of a governance rule that determines how exactly the copy should be made and what rights should be associated and by whom for the copied resource. When the attribute is not specified, this right allows to make a bit-wise identical copy of the resource and to result in an identical copy of the `r:license` that this right is specified being made to the copied resource. This right can be used for copying the resource that is either locally available or received from a remote location (e.g., via streaming or broadcasting) during the time this right is being exercised.

Figure AMD1.2 — `m1x:governedCopy` Right

A sample code fragment is provided below for illustration:

```
<r:license>
    <r:grant>
        <mx:play/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:grant>
        <m1x:governedCopy/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
</r:license>
```

In the above example, any principal is granted the right to play a movie clip, and the right to copy the clip together with the same license.

The following is another example license.

```
<r:license >
    <r:grant>
        <mx:play/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:grant>
        <m1x:governedCopy governanceRule="acme:CopyOnce"/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:issuer>
```


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```
        <r:keyHolder>
            <r:info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </r:info>
        </r:keyHolder>
    </r:issuer>
</r:license >
```

Suppose the governance rule named "`acme:CopyOnce`" only allows exercising this right once to make a bit-wise identical copy of the resource and associating the other rights in the same license to the copied resource by issuing another license by the same issuer. In this case, exercising the right `m1x:governedCopy` in the license will result in a bit-wise identical copy of the resource, and the following license:

```
<r:license >
    <r:grant>
        <mx:play/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:issuer>
        <r:keyHolder>
            <r:info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </r:info>
        </r:keyHolder>
    </r:issuer>
</r:license >
```

10.2.4.2.1.2 Normative Specification

Let *r* be a `m1x:GovernedCopy`. Then, if *r*/`@m1x:governanceRule` is present, *r* identifies the act of making a copy and associating right expressions with that copy in compliance with the compliance rules identified by *r*/`@m1x:governanceRule`. Otherwise, if *r*/`@m1x:governanceRule` is absent, *r* identifies the act of making a bit-wise identical copy and associating a right expression to that copy that is Equal to the License in the authorizer in one of the authorization proofs for the authorization request for that copy.

If *r* is used as the Right Member of an authorization request, then the Resource Member of that authorization request shall be present and shall identify the resource being copied.

10.2.4.2.2 GovernedMove

10.2.4.2.2.1 Informative Description

This element represents the right to move the resource and at the same time to result in certain rights being associated to the moved resource. The moved resource and its associated rights should not exist or be valid on the original repository after exercising this right. The optional attribute `@m1x:governanceRule` of type `QName` indicates the name of a governance rule that determines how exactly the resource should be moved and what rights should be associated and by whom for the moved resource. When the attribute is not specified, this right allows to the moved resource to be a bit-wise identical copy of the resource and to result in an identical copy of the `r:license` that this right is specified being made to the moved resource. This right can be used for moving the resource that is either locally available or received from a remote location during the time this right is being exercised.

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Figure AMD1.3 — `m1x:governedMove` Right

A sample code fragment is provided below for illustration.

```
<r:license>
    <r:grant>
        <mx:play/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:grant>
        <m1x:governedMove/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
</r:license>
```

In the above example, any principal is granted the right to play a movie clip, and the right to move the clip together with the same license.

Following is another example license.

```
<r:license >
    <r:grant>
        <mx:play/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:grant>
        <m1x:governedMove governanceRule="acme:MoveOnce"/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
        </r:digitalResource>
    </r:grant>
    <r:issuer>
        <r:keyHolder>
            <r:info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </r:info>
        </r:keyHolder>
    </r:issuer>
</r:license >
```

Suppose the governance rule named "`acme:MoveOnce`" only allows exercising this right once to move the resource in the bit-wise identical manner and associating the other rights in the same license to the moved resource by issuing another license by the same issuer. In this case, exercising the right `m1x:governedMove` in the license will result in moving the resource in the bit-wise identical manner and the following license:

```
<r:license >
    <r:grant>
        <mx:play/>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:movie:clips:hero_trailer.mpeg"/>
```


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```
        </r:digitalResource>
    </r:grant>
    <r:issuer>
        <r:keyHolder>
            <r:info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </r:info>
        </r:keyHolder>
    </r:issuer>
</r:license >
```

10.2.4.2.2.2 Normative Specification

Let *r* be a `m1x:GovernedMove`. Then, if *r*/`@m1x:governanceRule` is present, *r* identifies the act of performing the act `mx:move` to the Resource and associating right expressions with that moved Resource in compliance with the compliance rules identified by *r*/`@m1x:governanceRule`. Otherwise, if *r*/`@m1x:governanceRule` is absent, *r* identifies the act of performing the act `mx:move` to the Resource in the bit-wise identical sense and associating a right expression to that moved Resource that is Equal to the License in the authorizer in one of the authorization proofs for the authorization request for that moved Resource.

If *r* is used as the Right Member of an authorization request, then the Resource Member of that authorization request shall be present and shall identify the resource being moved.

10.2.4.2.3 Enlist

10.2.4.2.3.1 Informative Description

This element represents the right to link or enlist (the reference to) the related resource into a new playback control sequences description (i.e. play-list) for the optical disc. When it presents in an `r:grant` element, this element allows adding the value of the `resourceLocator` in the `m1x:protectedResource` element to the play-list.

Figure AMD1.4 — `m1x:enlist` Right

The following grant permits any user to link the associated (video object) resource "`file:///HDDVDdisc/ADV_OBJ/Vo3`" into a new play list being edited currently. In this example, the value of the `m1x:resourceLocator`, "`file:///HDDVDdisc/TM_OBJ/TM3`", will be added to the play list when the user selects the object "`Vo3`".

```
<r:grant>
   <m1x:enlist/>
   <m1x:protectedResource>
      <r:nonSecureIndirect URI="file:///HDDVDdisc/ADV_OBJ/Vo3"/>
      <resourceLocator>file:///HDDVDdisc/TM_OBJ/TM3</resourceLocator>
   </m1x:protectedResource>
</r:grant>
```

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10.2.4.2.3.2 Normative Specification

Let *r* be a `m1x:enlist`. Then *r* identifies the act of adding the Resource into a Resource which is a list of Resources.

If *r* is used as the Right Member of an authorization request, then the Resource Member of that authorization request shall be present and shall identify the resource being added to the list Resource.

10.2.4.2.4 Delist

10.2.4.2.4.1 Informative Description

This element represents the right to unlink or delist (the reference to) the related resource from a related playback control sequences description (i.e. play-list) for the optical disc when the play-list is newly created from an existing one. When it presents in an `r:grant` element, this element allows to remove the value of the `resourceLocator` in the `m1x:protectedResource` element from a (new) play-list created from the associated resource described as a member of `m1x:isPartOf`.

Figure AMD1.5 — `m1x:delist` Right

The following grant permits any user to delist the associated (video object) resource "`file:///HDDVDdisc/ADV_OBJ/Vo3`" from any play-list created from the associated resource "`file:///cache/playlist003`". In this example, the value of the `m1x:resourceLocator`, "`file:///HDDVDdisc/TM_OBJ/TM3`", will be removed from any newly created play-list that is created from the existing "`playlist003`" when the user selects to remove the "`Vo3`".

```
<r:grant>
    <m1x:delist/>
     <m1x:protectedResource>
        <r:nonSecureIndirect URI="file:///HDDVDdisc/ADV_OBJ/Vo3"/>
        <resourceLocator>file:///HDDVDdisc/TM_OBJ/TM3</resourceLocator>
    </m1x:protectedResource>
    <m1x:derivationConstraint>
        <m1x:isPartOf>
            <m1x:protectedResource>
                <r:nonSecureIndirect URI= "file:///cache/playlist003"/>
            </m1x:protectedResource>
         </m1x:isPartOf>
    </m1x:derivationConstraint>
</r:grant>
```

10.2.4.2.4.2 Normative Specification

Let *r* be a `m1x:delist`. Then *r* identifies the act of removing the Resource from a Resource which is a list of Resources and contains the Resource to be removed. If a condition `m1x:derviationContraint` is present, is satisified and contains a child element `m1x:isPartOf`, then the Resource should be removed from Resource identified by the `m1x:isPartOf`, as the result of performing the act identified by *r*.

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If *r* is used as the Right Member of an authorization request, then the Resource Member of that authorization request shall be present and shall identify the resource to be removed.

10.2.4.3 Resource Extension Elements

10.2.4.3.1 ProtectedResource

10.2.4.3.1.1 Informative Description

This resource represents a piece of content that is protected with some form of (symmetric key and/or public key) encryption. The element contains the following child elements: `r:digitalResource`, `xenc:EncryptedData`, and `xenc:EncryptedKey`.

The `r:digitalResource` element specifies the resource under consideration. The `nonSecureIndirect` element is used to identify the resource. If it is necessary to bind the identifier to the actual content of the resource, then the `secureIndirect` element provides elements to include a secure hash (`ds:DigestValue`) of the content.

The `xenc:EncrytedData` is for carrying information about encryption of the resource identified by `r:digitalResource`. The `xenc:EncryptedKey` contains information about encryption of the key (or keys) that is used to encrypt the resource. It should be clear that, regardless of whether the `xenc:EncryptedData` or `xenc:EncryptedKey` child elements appear, the `r:digitalResource` child element always represents the clear-text resource and not the encrypted resource.

The `m1x:resourceLocator` specifies the location of the associated resource. When the associated right is either `m1x:enlist` or `m1x:delist`, the location specified by this element should be added to or removed from the related containing resource. This element is different from the `r:digitalResource` element in that the latter provides the information for identifying the resource.

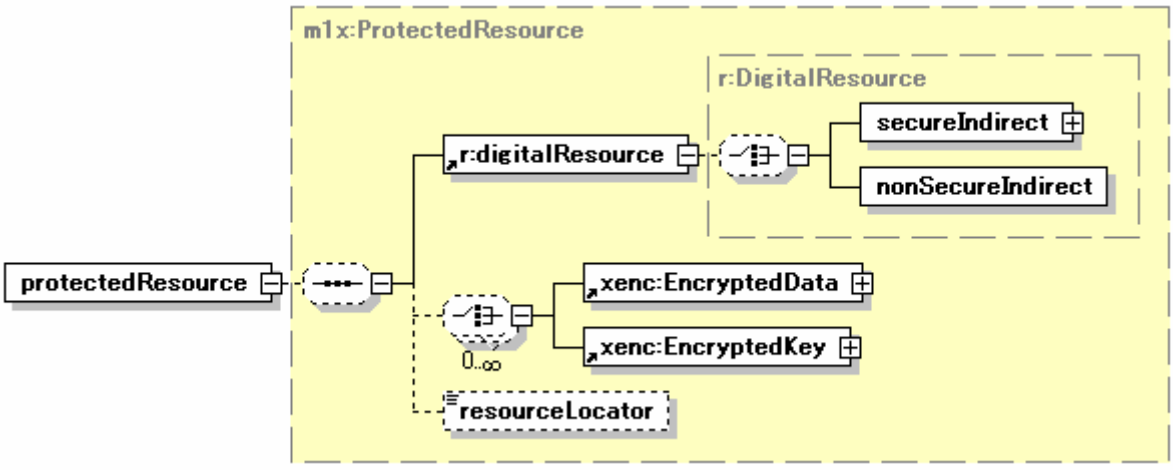

Figure AMD1.6 — `m1x:protectedResource` Resource

Here is an example showing that an MPEG movie resource is encrypted using the AES-128 encryption algorithm with a key whose key name is “Content Encryption Key Name”, and the AES key is further encrypted using the RSA encryption algorithm with a key whose key name is “User Key Name” and the encrypted key value is “AQABAA==”. This way the user can use a key with key name “User Key Name” to decrypt the resource encryption key from the value “AQABAA==” and use the decrypted key to further decrypt the encrypted movie resource.

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```
<r:grant>
    <m1x:identityHolder>
        <idSystem>urn:acme:imsi</idSystem>
        <idValue>IMSI:2232111123</idValue>
    </m1x:identityHolder>
    <mx:play/>
    <m1x:protectedResource>
        <r:digitalResource>
            <r:nonSecureIndirect URI="urn:encrypted-movie:matrixrevolutions.mpeg"/>
        </r:digitalResource>
        <xenc:EncryptedData Id="ED">
            <xenc:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#kw-aes128"/>
            <dsig:KeyInfo>
                <dsig:RetrievalMethod URI="#EK" Type="http://www.w3.org/2001/04/xmlenc#EncryptedKey"/>
                <dsig:KeyName>Content Encryption Key Name</dsig:KeyName>
            </dsig:KeyInfo>
        </xenc:EncryptedData>
        <xenc:EncryptedKey Id="EK">
            <xenc:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5"/>
            <dsig:KeyInfo>
                <dsig:KeyName>User Key Name</dsig:KeyName>
            </dsig:KeyInfo>
            <xenc:CipherData>
                <xenc:CipherValue>AQABAA==</xenc:CipherValue>
            </xenc:CipherData>
            <xenc:ReferenceList>
                <xenc:DataReference URI="#ED"/>
            </xenc:ReferenceList>
            <xenc:CarriedKeyName>Content Encryption Key Name</xenc:CarriedKeyName>
        </xenc:EncryptedKey>
    </m1x:protectedResource>
</r:grant>
```

10.2.4.3.1.2 Normative Specification

Let t be an `r:ProtectedResource`. Then t identifies a Digital Resource whose plaintext sequence of digital bits b is the sequence of digital bits identified by t/`r:digitalResource`. Moreover,

— If t/`xenc:EncryptedData` is present, then it should represent the encryption of b per XMLENC.

— If t/`xenc:EncryptedKey` is present, then it should represent the encryption of the cryptographic keys used for encrypting b per XMLENC.

— If t/`resourceLocator` is present, the URI the value of t/`resourceLocator` provides the location of the digital bits b. When the associated right is either `m1x:enlist` or `m1x:delist`, the location specified by this element should be added to or removed from the related containing resource.

10.2.4.4 Condition Extension Elements

10.2.4.4.1 DerivationConstraint

10.2.4.4.1.1 Informative Description

This condition element is used for derivation, including adapting, diminishing, enhancing, playing, enlisting and delisting of the associated resource. It imposes possible restrictions on the following:

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— which resource the associated resource has to be part of in order for the derivation to take place;

— which additional resources must or must not become part of the resource into which the associated resource is derived, and what possible temporal relationships of these additional resources must or must not have with the associated resource; and

— which resources can be used to replace the associated resource in the derived resource.

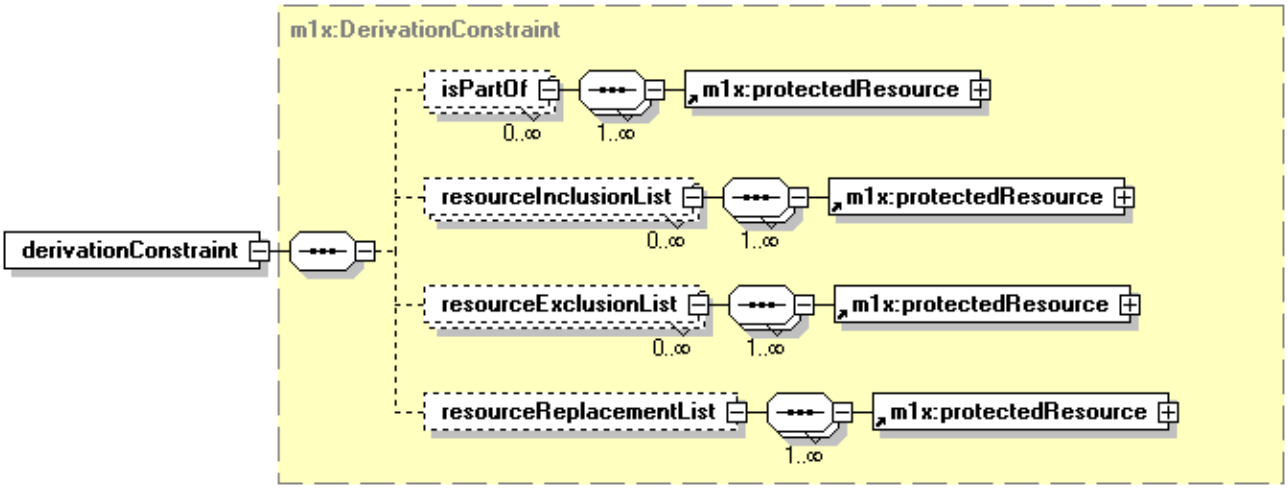

Figure AMD1.7 — `m1x:derivationConstraint` Condition

The element `m1x:isPartOf` indicates a list of protected resources, one or more of which the associated resource must be part of.

The element `m1x:resouceInclusionList` indicates a list of resources, each of which must become, possibly with respect to some temporal relations, part of the resource into which the associated resource is derived. The element `m1x:resouceExclusionList` indicates a list of resources, each of which must not become, possibly with respect to some temporal relations, part of the resource into which the associated resource is enhanced. The temporal relations are specified by values of an optional attribute `temporalRelation` of the two child elements. The attribute can take one of the following values:

— `any`: when rendered temporally, each of the list of resources is related to the associated resource in an unrestricted manner;

— `before`: when rendered temporally, each resource in the list is before the associated resource;

— `after`: when rendered temporally, each resource in the list is after the associated resource; and

— `simultaneous`: when rendered temporally, each resource in the list is simultaneous with the associated resource.

When the attribute is omitted, the default relation is identical to the one specified by the value "`any`" of the attribute.

The element `m1x:resourceReplacementList` indicates a list of resources, one of which must be used to replace the associated resource in the resource into which the associated resource is derived.

The condition specified by the `m1x:derivationConstraint` is satisfied, only if all of the following hold:

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