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AMENDMENT 1
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Information technology — Multimedia framework (MPEG-21)

Part 15: Event Reporting

AMENDMENT 1: Security in Event Reporting

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

Partie 15: Rapport d'événement

AMENDEMENT 1: Sécurité lors du rapport d'événement

Reference number
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Foreword

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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 21000-15:2006 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

Information technology — Multimedia framework (MPEG-21)

Part 15:
Event Reporting

AMENDMENT 1: Security in Event Reporting

Add the following new clause, after Clause 9:

10. Protection

10.1 General

This subclause specifies how to protect Event Report Requests and Event Reports at different levels of granularity, from a complete ER or ERR to specific elements within them.

First, it is defined how to ensure integrity and authenticity to the requested and reported data by means of digital signatures. Then, a mechanism for protecting ERs and ERRs is specified. Finally, Annex A presents the XML schema defined, Annex B presents an example of a digitally signed Event Report Request and Annex C presents an example of a partially protected Event Report.

10.2 Data integrity and authenticity

This subclause specifies a solution to provide authenticity and integrity to ERRs, ERs and elements within them. It makes use of the `dsig:Signature` element defined in [1]. Figure 3 sketches the dsig:`Signature` element. The semantics for all elements under `Signature` should refer to W3C XML Signature recommendation [1].

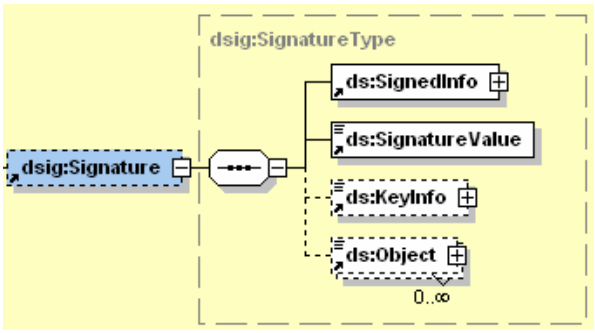

Figure 3 – Signature element

The dsig:Signature element is added as an optional child element to the following elements of ISO/IEC 21000-15:

- <erl:ERR>
- <erl:ERRDescriptor>
- <erl:Modification>
- <erl:ERSpecification>
- <erl:EventConditionDescriptor>
- <erl:ER>
- <erl:ERDescriptor>
- <erl:Modification>
- <erl:Recipient>
- <erl:Status>
- <erl:Source>
- <erl:ERData>
- <erl:EmbeddedERR>

Figure 4 presents the diagram for the resultant ER element. It has the `dsig:Signature` element as an optional child element. If present, the `dsig:Signature` element shall contain the digital signature for the `erl:ER` element.

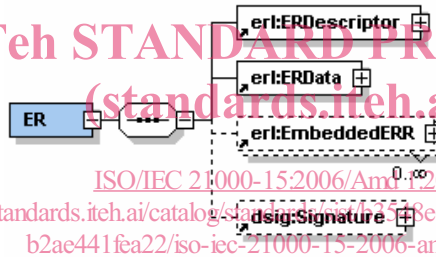

Figure 4 – ER element

10.3 Data encryption

This subsection specifies how to protect Event Reports and Event Report Requests and elements within them. It defines the equivalent encrypted elements for ERs and ERRs according to the W3C XML Encryption recommendation.

10.3.1 Encrypted elements

The equivalent encrypted elements are defined according to W3C XML Encryption recommendation [2] for ERs and ERRs are the following:

- <erl:EncryptedERR>
- <erl:EncryptedERSpecification>
- <erl:EncryptedEventConditionDescriptor>
- <erl:EncryptedER>
- <erl:EncryptedERDescriptor>
- <erl:EncryptedERData>
- <erl:EncryptedEmbeddedERR>

Figure 5 presents the `erl:EncryptedER` element defined. The semantics for all elements under `erl:EncryptedER` should refer to [2].

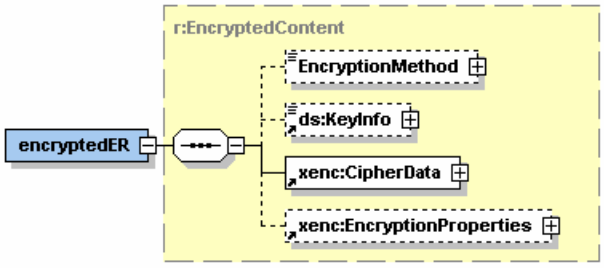

Figure 5 – EncryptedER element

Add the following new annexes, after Annex D:

Annex E
(informative)

XML Schema Definition

E.1 General

This annex contains the XML schema for the syntax of the types and elements of the Security in Event Reporting Amendment 1.

E.2 Schema for Event Reporting

This subclause contains the XML Schema for Event Reporting. Using this schema ERs, ERRs and elements within them can be digitally signed using the dsig:Signature element as defined in the W3C XML Signature recommendation and they can be encrypted using the EncryptedER elements.

```
<?xml version="1.0"?>
<!--============================================================-->
<!--============================================================-->
<!--                                                            -->
<!--           Schema for ERL XML Document Type                 -->
<!--                                                            -->
<!--============================================================-->
<!--============================================================-->
<xsd:schema xmlns:erl="urn:mpeg:mpeg21:2005:01-ERL-NS"
xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:dii="urn:mpeg:mpeg21:2002:01-
DII-NS" xmlns:dia="urn:mpeg:mpeg21:2003:01-DIA-NS"
xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS"
xmlns:mpeg7="urn:mpeg:mpeg7:schema:2004"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
```

```
xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:ns1="urn:uddi-
org:schemaCentricC14N:2002-07-10" targetNamespace="urn:mpeg:mpeg21:2005:01-ERL-
NS" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xsd:import namespace="urn:mpeg:mpeg21:2003:01-DIA-NS"
schemaLocation="dia.xsd"/>
  <xsd:import namespace="urn:mpeg:mpeg21:2002:01-DII-NS"
schemaLocation="dii.xsd"/>
  <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS" schemaLocation="rel-
r.xsd"/>
  <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-SX-NS" schemaLocation="rel-
sx.xsd"/>
  <xsd:import namespace="urn:mpeg:mpeg7:schema:2004" schemaLocation="mpeg7.xsd"/>
  <xsd:import namespace="http://www.w3.org/XML/1998/namespace"
schemaLocation="./xml_2001.xsd"/>
  <xsd:import namespace="http://www.w3.org/2000/09/xmldsig#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmldsig-core-20020212/xmldsig-core-
schema.xsd"/>
  <xsd:import namespace="http://www.w3.org/2001/04/xmlenc#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmlenc-core-20021210/xenc-
schema.xsd"/>
  <xsd:import namespace="urn:uddi-org:schemaCentricC14N:2002-07-10"
schemaLocation="http://www.uddi.org/schema/SchemaCentricCanonicalization.xsd"/>
  <!-- ########################################## -->
  <!--  7.1 Definition of an Event Report Request   -->
  <!-- ########################################## -->
  <xsd:element name="ERR">
    <xsd:complexType>
      <xsd:choice>
        <xsd:sequence>
          <xsd:element ref="erl:ERRDescriptor"/>
          <xsd:element ref="erl:ERSpecification"/>
          <xsd:element ref="erl:EventConditionDescriptor"/>
          <xsd:element ref="dsig:Signature" minOccurs="0"/>
        </xsd:sequence>
        <xsd:element name="EncryptedERR" type="erl:EncryptedData"/>
      </xsd:choice>
    </xsd:complexType>
  </xsd:element>
  <!-- ######################################## -->
  <!-- 7.2 Definition of ERRDescriptor          -->
  <!-- ######################################## -->
  <xsd:element name="ERRDescriptor">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="LifeTime" minOccurs="0">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="StartTime" type="xsd:dateTime"/>
              <xsd:element name="EndTime" type="xsd:dateTime"/>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
        <xsd:element name="Modification" type="erl:ModificationType"
maxOccurs="unbounded"/>
        <xsd:element name="Priority" default="2" minOccurs="0">
          <xsd:simpleType>
            <xsd:restriction base="xsd:string">
              <xsd:enumeration value="0"/>
              <xsd:enumeration value="1"/>
```

```
            <xsd:enumeration value="2"/>
            <xsd:enumeration value="3"/>
            <xsd:enumeration value="4"/>
            <xsd:enumeration value="5"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:element>
      <xsd:element ref="dsig:Signature" minOccurs="0"/>
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>
 <xsd:complexType name="ModificationType">
  <xsd:sequence>
    <xsd:element ref="erl:PeerId"/>
    <xsd:element ref="erl:UserId"/>
    <xsd:element name="Time" type="xsd:dateTime"/>
    <xsd:element name="Description" type="erl:DescriptionType" minOccurs="0"/>
    <xsd:element ref="dsig:Signature" minOccurs="0"/>
  </xsd:sequence>
 </xsd:complexType>
 <!-- ################################################ -->
 <!-- 7.3 Definition of ER Descriptor within an ER-R  -->
 <!-- ################################################ -->
 <xsd:element name="ERSpecification">
  <xsd:complexType>
    <xsd:choice>
      <xsd:sequence>
       <xsd:element ref="dii:Identifier" minOccurs="0"/>
       <xsd:element name="ERDescription" type="erl:DescriptionType"
minOccurs="0"/>
       <xsd:element name="AccessControl" type="xsd:anyType" minOccurs="0"/>
       <xsd:element name="ERPayloadSpecification">
         <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="ERIdentifier" minOccurs="0">
             <xsd:complexType>
                <xsd:simpleContent>
                   <xsd:extension base="xsd:anyURI">
                      <xsd:attribute name="baseId" type="xsd:boolean"/>
                   </xsd:extension>
                </xsd:simpleContent>
             </xsd:complexType>
            </xsd:element>
            <xsd:element name="PeerId" minOccurs="0"/>
            <xsd:element name="UserId" minOccurs="0"/>
            <xsd:element name="Time" minOccurs="0"/>
            <xsd:element name="Location" minOccurs="0"/>
            <xsd:element name="DIOperation" minOccurs="0" maxOccurs="unbounded"/>
            <xsd:element name="DomainData" minOccurs="0" maxOccurs="unbounded">
             <xsd:complexType>
                <xsd:attribute name="reportTag" type="xsd:string"
use="optional"/>
                <xsd:attribute name="semantics" type="xsd:anyURI"
use="required"/>
                <xsd:attribute name="syntax" type="xsd:anyURI" use="required"/>
                <xsd:attribute name="value" type="xsd:string" use="optional"/>
             </xsd:complexType>
            </xsd:element>
            <xsd:element name="DIMetadata" minOccurs="0" maxOccurs="unbounded">
             <xsd:complexType>
```

```
                <xsd:sequence>
                   <xsd:element name="DISelection" minOccurs="0">
                      <xsd:complexType>
                         <xsd:choice>
                            <xsd:element name="DISelectionViaDII"
minOccurs="0"/>
                            <xsd:element name="DISelectionViaRelatedDII"
minOccurs="0"/>
                            <xsd:element name="DISelectionViaXPath"
minOccurs="0"/>
                            <xsd:element name="DISelectionViaMetadataElements"
minOccurs="0" maxOccurs="unbounded">
                               <xsd:complexType>
                                  <xsd:attribute name="nameSpace"/>
                                  <xsd:attribute name="itemType"/>
                                  <xsd:attribute name="itemName"/>
                                  <xsd:attribute name="internalOperator"/>
                                  <xsd:attribute name="itemValue"/>
                                  <xsd:attribute name="externalOperator"/>
                               </xsd:complexType>
                            </xsd:element>
                         </xsd:choice>
                      </xsd:complexType>
                   </xsd:element>
                   <xsd:element name="DIMetadataElement" minOccurs="0"
maxOccurs="unbounded">
                      <xsd:complexType>
                         <xsd:attribute name="nameSpace"/>
                         <xsd:attribute name="tagName"/>
                      </xsd:complexType>
                   </xsd:element>
                   <!-- Selection of the DI from which the metadata will be
reported -->
                   <!-- Selection of the metadata to be reported -->
                </xsd:sequence>
             </xsd:complexType>
            </xsd:element>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="ERFormatSpecification">
        <xsd:complexType>
         <xsd:choice>
           <xsd:element name="Ref" type="xsd:anyURI"/>
           <xsd:element name="XMLschema" type="xsd:anyURI"/>
           <xsd:element name="MimeType" type="xsd:string"/>
         </xsd:choice>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="ERDeliverySpecification" minOccurs="0"
maxOccurs="unbounded">
        <xsd:complexType>
         <xsd:sequence>
           <xsd:element name="Recipient" type="erl:RecipientType" minOccurs="0"
maxOccurs="unbounded"/>
           <xsd:element name="DeliveryTime" type="erl:TimeType"/>
           <xsd:element name="DITransportService">
            <xsd:complexType>
               <xsd:sequence>
                  <xsd:element ref="r:serviceReference"/>
```

```
                </xsd:sequence>
              </xsd:complexType>
            </xsd:element>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element ref="erl:EmbeddedERR" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="dsig:Signature" minOccurs="0"/>
    </xsd:sequence>
    <xsd:element name="EncryptedERSpecification" type="erl:EncryptedData"/>
   </xsd:choice>
  </xsd:complexType>
 </xsd:element>
 <!-- ############################################ -->
 <!-- 7.4 Definition of Event Condition Descriptor -->
 <!-- ############################################ -->
 <xsd:element name="EventConditionDescriptor">
  <xsd:complexType>
   <xsd:choice>
    <xsd:group ref="erl:EventConditionGroup" maxOccurs="unbounded"/>
    <xsd:element name="EncryptedEventConditionDescriptor"
type="erl:EncryptedData"/>
   </xsd:choice>
  </xsd:complexType>
 </xsd:element>
 <xsd:group name="EventConditionGroup">
  <xsd:sequence>
   <xsd:element name="Operator" type="erl:ExternalOperator" minOccurs="0"
maxOccurs="unbounded"/>
   <xsd:element name="TimeCondition" minOccurs="0" maxOccurs="unbounded">
    <xsd:complexType>
     <xsd:group ref="erl:TimeConditionGroup" maxOccurs="unbounded"/>
    </xsd:complexType>
   </xsd:element>
   <xsd:element name="Operator" type="erl:ExternalOperator" minOccurs="0"
maxOccurs="unbounded"/>
   <xsd:element name="DIOperationCondition" minOccurs="0"
maxOccurs="unbounded">
    <xsd:complexType>
     <xsd:group ref="erl:DIOperationConditionGroup" maxOccurs="unbounded"/>
    </xsd:complexType>
   </xsd:element>
   <xsd:element name="Operator" type="erl:ExternalOperator" minOccurs="0"
maxOccurs="unbounded"/>
   <xsd:element name="PeerCondition" minOccurs="0" maxOccurs="unbounded">
    <xsd:complexType>
     <xsd:group ref="erl:PeerConditionGroup" maxOccurs="unbounded"/>
    </xsd:complexType>
   </xsd:element>
   <xsd:element name="Operator" type="erl:ExternalOperator" minOccurs="0"
maxOccurs="unbounded"/>
   <xsd:element ref="dsig:Signature" minOccurs="0"/>
  </xsd:sequence>
 </xsd:group>
 <xsd:group name="TimeConditionGroup">
  <xsd:sequence>
   <xsd:element name="TimeEvent" type="erl:TimeType"/>
   <xsd:element name="Operator" type="erl:ExternalOperator" minOccurs="0"
maxOccurs="unbounded"/>
  </xsd:sequence>
```