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AMENDMENT 2
2016-11-15

Information technology — Biometric data interchange formats —

Part 6: Iris image data

AMENDMENT 2: XML encoding and clarification of defects

Technologies de l'information — Formats d'échange de données biométriques —

Partie 6: Données d'image de l'iris

AMENDEMENT 2: Codage XML et précisions concernant les défauts

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

Amendment 2 to ISO/IEC 19794-6:2011 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

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Information technology — Biometric data interchange formats —

Part 6: Iris image data

AMENDMENT 2: XML encoding and clarification of defects

Page v, Introduction

Add the following paragraph to the end of the Introduction

Additionally, this document supports both binary and XML encodings, to support a spectrum of user requirement. With XML, this document will meet the requirements modern IT architectures. With binary encoding, this document will also be able to be used in bandwidth or storage constrained environments. Annex G specifies the schema that XML-encoded iris image records must conform to. Annex H provides an example of a valid XML-encoded iris image record.

Page 1, Clause 2 Conformance

Replace the existing text in Clause 2 Conformance with the following:

A binary data record conforms to this document if it satisfies all the format requirements with respect to its structure, data values, relationships among its fields, and with respect to relations between its fields and the underlying input that are specified throughout Clause 7.

An XML document conforms to this document if it satisfies the format requirements with respect to its structure, with respect to relations among its fields, and with respect to relations between its fields and the underlying input that are specified within Annex C.

A system that produces biometric data records is conformant to this document if all biometric data records that it outputs conform to this document (as defined above) as claimed in the Implementation Conformance Statement associated with that system. A system does not need to be capable of producing biometric data records that cover all possible aspects of this document, but only those that are claimed to be supported by the system in the Implementation Conformance Statement (ICS).

A system that uses biometric data records is conformant to this document if it can read, and use for the purpose intended by that system, all biometric data records that conform to this document (as defined above) as claimed in the Implementation Conformance Statement associated with that system. A system does not need to be capable of using biometric data records that cover all possible aspects of this document, but only those that are claimed to be supported by the system in an Implementation Conformance Statement (ICS).

Biometric data interchange format conformance tests conform to this document if they satisfy all of the normative requirements set forth in Annex A. Specifically, all Level-1, Level-2 and Level-3 tests shall use the assertions defined in Table A.2 and Table A.3 in conformity with the concept and rules set in ISO/IEC 19794-1:2011/Amd 1:2013.

Implementations of this document tested according to the specified methodology shall be able to claim conformance only to those biometric data record (BDB) requirements specified in this document that are tested by the test methods established by this methodology.

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Implementations of this document do not necessarily need to conform to all possible aspects of this document, but only to those requirements that are claimed to be supported by the implementation in an implementation conformance statement (ICS), filled out in accordance with ISO/IEC 19794-1:2011/Amd 1:2013, Annex A and Table A.1.

Page 2, Clause 3 Normative references

Add the following reference to the normative references list:

— http://www.w3.org/XML/Schema

Page 13, Table 7

Add the following row to Table 7:

37 (0025_{Hex})	XML-iris-image	{iso(1) registration-authority(1) cbeff(19785) biometric-organization(0) jtc1-sc37(257) bdbs(0) XML-iris-image(37)}

Page XX, Annex A

Replace A.3 with the following:

A.3 Table of test assertions for binary encoded records

The specific test assertions required for conformance testing for binary records to this document are listed in Table A.2, which extends over multiple pages. The conformance test assertions are listed in the order in that the corresponding fields are required to appear, if present, in a conforming record. The normative requirements of this document, as summarized in Table A.1, are referenced in the tables.

Page XX, Annex A

Rename Table A.2 to:

Table A.2 — Level 1 and Level 2 Conformance Test assertions for all binary encoded records

Rename Table A.3 to:

Table A.3 — Level 1 and Level 2 Conformance Test assertions for Type 1 binary encoded records

Rename Table A.4 to:

Table A.4 — Level 1 and Level 2 Conformance Test assertions for Type 2 binary encoded records

Rename Table A.5 to:

Table A.5 — Level 1 and Level 2 Conformance Test assertions for Type 3 binary encoded records

Rename Table A.6 to:

Table A.6 — Level 1 and Level 2 Conformance Test assertions for Type 7 binary encoded records

Add new section A.4:

A.4 Tables of test assertions for XML-encoded records

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The specific test assertions required for conformance testing for XML-encoded records to this document are listed in Tables A.7, A.8, A.9, A.10 and A.11, which may extend over multiple pages. The conformance test assertions are listed in the order in that the corresponding fields are required to appear, if present, in a conforming record. The normative requirements of this document, as summarized in Table A.1, are referenced in the tables.

Table A.7 — Conformance test assertions for all XM-encoded records

Test Num	Rqt ID	Level	Element Name	Operator	Opd	Test Note	Status	IUT Spt	Spt Range	Test Result
X1	R3-R4	1	IrisImage.Version.Major	EQ	2		M			
X2	R3-R4	1	IrisImage.Version.Minor	EQ	0		M			
X3	R-174	2	IrisImage.RepresentationList.Representation.ImageCompressionAlgorithmName	EQ	Compression Algorithm of decoded base64 IrisImage.RepresentationList.Representation.IrisImageData	1	M			
X4	R-186	2	IrisImage.RepresentationList.Representation.Width	EQ	Width Value found within decoded base64 IrisImage.RepresentationList.Representation.IrisImageData	1	M			
X5	R-190	2	IrisImage.RepresentationList.Representation.Height	EQ	Height Value found within decoded base64 IrisImage.RepresentationList.Representation.IrisImageData	1	M			
X6	R-194	2	IrisImage.RepresentationList.Representation.BitDepth	EQ	BitDepth Value found within decoded base64 IrisImage.RepresentationList.Representation.IrisImageData	1	M			
X7	R-207	2	IrisImage.RepresentationList.Representation.SmallestIrisCentreX	LT	IrisImage.RepresentationList.Representation.Width	1	M			

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Table A.7 *(continued)*

Test Num	Rqt ID	Level	Element Name	Operator	Opd	Test Note	Status	IUT Spt	Spt Range	Test Result
X8	R-210	2	IrisImage. Representation-List. Representation. LargestIrisCentreX	LT	IrisImage. Representation-List. Representation. Width	1	M			
X9	R-213	2	IrisImage. Representation-List. Representation. SmallestIrisCentreY	LT	IrisImage. Representation-List. Representation. Height	1	M			
X10	R-216	2	IrisImage. Representation-List. Representation. SmallestIrisCentreY	LT	IrisImage. Representation-List. Representation. Height	1	M			
X11	R-219	2	IrisImage. Representation-List. Representation. SmallestIrisDiameter	LTE	Min(IrisImage. Representation-List. Representation. Width, IrisImage. Representation-List. Representation. Height)	1	M			
X12	R-222	2	IrisImage. Representation-List. Representation. LargestIrisDiameter	LTE	Min(IrisImage. Representation-List. Representation. Width, IrisImage. Representation-List. Representation. Height)	1	M			

Table A.8 — Conformance test assertions for type 1 XML-encoded records

Test Num	Rqt ID	Level	Element Name	Operator	Opd	Test Note	Status	IUT Spt	Spt Range	Test Result
X101	R-153	2	Image Data, Iris centres, Iris height, Iris diameters	C		3				
X102	R-154	2	Image Data, Iris centres, Iris height, Iris diameters	C		4				
X103	R-155	2	Image Format and Iris image properties bit field	C		5				
X104	R-157	2	Image Format and Image data	C		5				

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Table A.9 — Conformance test assertions for type 2 XML-encoded records

Test Num	Rqt ID	Level	Element Name	Opera-tor	Opd	Test Note	Status	IUT Spt	Spt Range	Test Result
X201	R-153	2	Image Data, Iris centres, Iris height, Iris diameters	C		3				
X202	R-154	2	Image Data, Iris centres, Iris height, Iris diameters	C		4				
X203	R-155	2	Image Format and Iris image proper-ties bit field	C		5				
X204	R-157	2	Image Format and Image data	C		5				
X205	R-158	2	IrisImage. Representation-List. Representation. Width	EQ	640					
X206	R-158	2	IrisImage. Representation-List. Representation. Height	EQ	480					

Table A.10 — Conformance test assertions for type 3 XML-encoded records

Test Num	Rqt ID	Level	Element Name	Opera-tor	Opd	Test Note	Status	IUT Spt	Spt Range	Test Result
X301	R-153	2	Image Data, Iris centres, Iris height, Iris diameters	C		3				
X302	R-154	2	Image Data, Iris centres, Iris height, Iris diameters	C		4				
X303	R-155	2	Image Format and Iris image proper-ties bit field	C		5				
X304	R-157	2	Image Format and Image data	C		5				
X305	R-159	2	Iris Centre	C		6				

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Table A.11 — Conformance test assertions for type 1 XML-encoded records

Test Num	Rqt ID	Level	Element Name	Operator	Opd	Test Note	Status	IUT Spt	Spt Range	Test Result
X701	R-153	2	Image Data, Iris centres, Iris height, Iris diameters	C		3				
X702	R-154	2	Image Data, Iris centres, Iris height, Iris diameters	C		4				
X703	R-155		Image Format and Iris image properties bit field	C		5				
X704	R-157		Image Format and Image data	C		5				
X705	R-159	2	Iris Centre	C		6				

Test notes:

a) For values within the same Representation

b) For values across all Representations within the RepresentationList

c) {Iris image horizontal margin}

IF ({iris centre, smallest x} = 0 OR {iris centre, largest x} = 0 OR {iris diameter, largest} = 0)
RETURN ("Automatic test not available, perform visual test or use additional processing algorithm")
END IF
radius = {iris diameter, largest}/2
margin = 0,2 * radius;
IF ({iris centre, smallest x} – radius < margin}
RETURN ("Error, left margin not conformant")
ENDIF
IF ({image width} - {iris centre, largest x} + radius < margin}
RETURN ("Error, right margin not conformant")
ENDIF
RETURN ("Level 2 test passed");

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d) {Iris image vertical margin}

IF ({iris centre, smallest y} = 0 OR {iris centre, largest y} = 0 OR {iris diameter, largest} = 0)
RETURN ("Automatic test not available, perform visual test or use additional processing algorithm")
END IF
radius = {iris diameter, largest}/2
margin = 0,2 * radius;
IF ({iris centre, smallest y} – radius < margin}
RETURN ("Error, upper margin not conformant")
ENDIF
IF ({image height} - {iris centre, largest y} + radius < margin}
RETURN ("Error, lower margin not conformant")
ENDIF
RETURN ("Level 2 test passed");

e) {Image type, image format and image properties relationships}

Format = RAW
IF ({Image data[0 TO 7]} = (89 50 4E 47 0D 0A 1A 0A)Hex)
IF ({Image format} ! = 14)
RETURN ("Error (Level 2). Format not compliant with image data."
ENDIF
Format = PNG
ENDIF

IF ({Image data [0 TO 7] = (00 00 00 0C 6A 50 20 20) Hex)
IF ({Image format} ! = 10)
RETURN ("Error (Level 2). Format not compliant with image data."
ENDIF
Format = JP2
ENDIF
IF (Format = RAW)
RETURN ("Error (Level 1). RAW image data used.")
ENDIF
IF (Format = PNG)
IF (({Image type} = 01) AND ({Image data [20]! = 0))
RETURN ("Error (Level 2). Interlaced method used in PNG data for Type 01.")
ENDIF
ENDIF
RETURN ("Success")

f) {Iris centre}

IF ({iris centre, smallest x} = 0 OR {iris centre, largest x} = 0)
RETURN ("Automatic test not available, perform visual test or use additional processing algorithm")
ENDIF
centreX = ({iris centre, smallest X} + {iris centre, largest X})/2
centreY = ({iris centre, smallest Y} + {iris centre, largest Y})/2
IF ((centreX < ({Image width}/2 –1)) OR ((centreX> ({Image width}/2 +1))
RETURN ("Error (Level 2). Iris not centred horizontally.")
ENDIF
IF ((centreY < ({Image height}/2 –1)) OR ((centreY> ({Image height}/2 +1))
RETURN ("Error (Level 2). Iris not centred vertically.")
ENDIF
RETURN("Success")

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Page XX

Insert the following text as a new normative Annex C:

Annex C
(normative)
XML schema definition

C.1 General

This annex defines the schema that shall be used to validate XML iris image records encoded in an XML format.

C.2 Iris image schema

```
 <?xml version = "1.0" encoding = "utf-8" ?>
 <!--Permission is hereby granted, free of charge in perpetuity, to any person obtaining
a copy of the Schema, to use, copy, modify, merge and distribute free of charge, copies
of the Schema for the purposes of developing, implementing, installing and using software
based on the Schema, and to permit persons to whom the Schema is furnished to do so,
subject to the following conditions:
THE SCHEMA IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED,
INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR
PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE
FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR
OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SCHEMA OR THE USE OR OTHER
DEALINGS IN THE SCHEMA. In addition, any modified copy of the Schema shall include the
following notice: THIS SCHEMA HAS BEEN MODIFIED FROM THE SCHEMA DEFINED IN ISO/IEC 19794-
6, AND SHOULD NOT BE INTERPRETED AS COMPLYING WITH THAT STANDARD-->


 <xs:schema xmlns = "http://standards.iso.
org/iso-iec/19794/-6/ed-2/amd/2" xmlns:cmn = "http://standards.iso.
org/iso-iec/19794/-1/ed-2/amd/2" attributeFormDefault = "unqualified"
elementFormDefault = "qualified" targetNamespace = "http://standards.iso.
org/iso-iec/19794/-6/ed-2/amd/2" xmlns:xs = "http://www.w3.org/2001/XMLSchema">
    <xs:import schemaLocation = "19794-1_ed2_amd2.xsd" namespace = "http://standards.iso.
org/iso-iec/19794/-1/ed-2/amd/2"/>


  <xs:simpleType name = "IrisImageType">
    <xs:restriction base = "xs:string">
      <xs:enumeration value = "Uncropped"/>
      <xs:enumeration value = "VGA"/>
      <xs:enumeration value = "Cropped"/>
      <xs:enumeration value = "CroppedAndMasked"/>
    </xs:restriction>
  </xs:simpleType>


  <xs:simpleType name = "HorizontalOrientationType">
    <xs:restriction base = "xs:string">
      <xs:enumeration value = "Undefined"/>
      <xs:enumeration value = "LeftToRight"/>
      <xs:enumeration value = "RightToLeft"/>
    </xs:restriction>
  </xs:simpleType>


  <xs:simpleType name = "VerticalOrientationType">
    <xs:restriction base = "xs:string">
      <xs:enumeration value = "Undefined"/>
      <xs:enumeration value = "TopToBottom"/>
      <xs:enumeration value = "BottomToTop"/>
    </xs:restriction>
  </xs:simpleType>
```

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```
  <xs:simpleType name = "CompressionHistoryType">
    <xs:restriction base = "xs:string">
      <xs:enumeration value = "Undefined"/>
      <xs:enumeration value = "LosslessOrNone"/>
      <xs:enumeration value = "Lossy"/>
    </xs:restriction>
  </xs:simpleType>


  <xs:simpleType name = "IrisCaptureDeviceTechnologyType">
    <xs:restriction base = "xs:string">
      <xs:enumeration value = "Unknown"/>
      <xs:enumeration value = "CMOS/CCD"/>
    </xs:restriction>
  </xs:simpleType>


  <xs:simpleType name = "EyeLabelType">
    <xs:restriction base = "xs:string">
      <xs:enumeration value = "Unknown"/>
      <xs:enumeration value = "RightIris"/>
      <xs:enumeration value = "LeftIris"/>
    </xs:restriction>
  </xs:simpleType>


  <xs:complexType name = "IrisCaptureDeviceType">
    <xs:sequence>
      <xs:element name = "DeviceID" type = "cmn:RegistryIDType"/>
      <xs:element name = "CertificationIDList" minOccurs = "0">
        <xs:complexType>
          <xs:sequence>
            <xs:element name = "CertificationID" type = "cmn:RegistryIDType"
maxOccurs = "unbounded"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name = "Technology" type = "IrisCaptureDeviceTechnologyType"/>
    </xs:sequence>
  </xs:complexType>


  <xs:simpleType name = "IrisImageCompressionType">
    <xs:restriction base = "xs:string">
      <xs:whiteSpace value = "collapse"/>
      <xs:enumeration value = "None"/>
      <xs:enumeration value = "PNG"/>
      <xs:enumeration value = "JP2"/>
    </xs:restriction>
  </xs:simpleType>


  <xs:complexType name = "IrisImageRepresentationType">
    <xs:sequence>
      <xs:element name = "CaptureDevice" type = "IrisCaptureDeviceType" minOccurs = "1"/>
      <xs:element name = "QualityList" minOccurs = "0">
        <xs:complexType>
          <xs:sequence>
            <xs:element name = "Quality" type = "cmn:QualityType"
maxOccurs = "unbounded"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name = "Position" type = "EyeLabelType"/>
      <xs:element name = "IrisImageType" type = "IrisImageType"/>
      <xs:element name = "BitDepth">
        <xs:simpleType>
          <xs:restriction base = "xs:unsignedByte">
            <xs:minInclusive value = "8"/>
          </xs:restriction>
```

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```
        </xs:simpleType>
      </xs:element>
      <xs:element name = "ImageCompressionAlgorithmName"
type = "IrisImageCompressionType"/>
      <xs:element name = "HorizontalOrientation" type = "HorizontalOrientationType"/>
      <xs:element name = "VerticalOrientation" type = "VerticalOrientationType"/>
      <xs:element name = "CompressionHistory" type = "CompressionHistoryType"/>
      <xs:element name = "Range" minOccurs = "0">
        <xs:complexType>
          <xs:choice>
            <xs:element name = "Value" type = "xs:unsignedShort"/>
            <xs:element name = "MeasureFailed"/>
          </xs:choice>
        </xs:complexType>
      </xs:element>
      <xs:element name = "RollAngle" type = "xs:unsignedShort"  minOccurs = "0"/>
      <xs:element name = "RollAngleUncertainty" type = "xs:unsignedShort"
minOccurs = "0"/>
      <xs:element name = "SmallestIrisCentreX" type = "xs:unsignedShort"
minOccurs = "0"/>
      <xs:element name = "LargestIrisCentreX" type = "xs:unsignedShort"  minOccurs = "0"/>
      <xs:element name = "SmallestIrisCentreY" type = "xs:unsignedShort"
minOccurs = "0"/>
      <xs:element name = "LargestIrisCentreY" type = "xs:unsignedShort"  minOccurs = "0"/>
      <xs:element name = "SmallestIrisDiameter" type = "xs:unsignedShort"
minOccurs = "0"/>
      <xs:element name = "LargestIrisDiameter" type = "xs:unsignedShort"
minOccurs = "0"/>
      <xs:element name = "CaptureDateTime" type = "xs:dateTime"/>
      <xs:element name = "Width" type = "xs:unsignedShort"/>
      <xs:element name = "Height" type = "xs:unsignedShort"/>
      <xs:element name = "IrisImageData" type = "xs:base64Binary"/>
    </xs:sequence>
  </xs:complexType>


  <xs:element name = "IrisImage">
    <xs:complexType>
      <xs:sequence>
        <xs:element name = "Version" type = "cmn:VersionType" minOccurs = "1"/>
        <xs:element name = "RepresentationList">
          <xs:complexType>
            <xs:sequence>
              <xs:element name = "Representation" type = "IrisImageRepresentationType"
maxOccurs = "unbounded"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
      <xs:attribute ref = "cmn:SchemaVersion" use = "required"/>
    </xs:complexType>
  </xs:element>


 </xs:schema>
```

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