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Information technology — JPSearch —

Part 5:
Data interchange format between image repositories

Technologies de l'information — JPSearch —

Partie 5: Format d'échange de données entre référentiels d'images

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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.

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ISO/IEC 24800-5 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 24800 consists of the following parts, under the general title *Information technology — JPSearch*:

— *Part 1: System framework and components*

— *Part 2: Registration, identification and management of schema and ontology*

— *Part 3: Query format*

— *Part 4: File format for metadata embedded in image data (JPEG and JPEG 2000)*

— *Part 5: Data interchange format between image repositories*

— *Part 6: Reference software*

Introduction

ISO/IEC 24800 was developed to be an interoperable mechanism to handle metadata among compliant systems, including repository, search engine, and file entities. This part of ISO/IEC 24800 aims at a format for the exchange of image collections and respective metadata between JPSearch compliant repositories. It enables the synchronization of repositories in order to facilitate simple and fully interoperable exchanges across different devices and platforms.

Information technology — JPSearch —

Part 5:
Data interchange format between image repositories

1   Scope

This part of ISO/IEC 24800, JPSearch, provides a data interchange format for the exchange of image collections and respective metadata between JPSearch compliant repositories. The metadata can be at the level of the image or an image collection. By providing a solution for the carriage of image collections and associated metadata between compliant devices and platforms, the JPSearch data interchange format enables the synchronization of repositories in order to facilitate simple and fully interoperable exchanges across different devices and platforms.

The JPSearch data interchange format should enable the easy and reliable transfer of data between different hardware and software systems. In particular, it should support functions such as

— exchange of data between JPSearch repositories on different devices and platforms,

— consolidation of metadata generated on different systems,

— transferral of data to a newer and better system,

— consolidation of selected data to a centralized repository, and

— archive of data in a format which will survive current products.

2   Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15938-1, *Information technology — Multimedia content description interface — Part 1: Systems*

ISO/IEC 15938-2, *Information technology — Multimedia content description interface — Part 2: Description definition language*

ISO/IEC 15938-3, *Information technology — Multimedia content description interface — Part 3: Visual*

ISO/IEC 15938-4, *Information technology — Multimedia content description interface — Part 4: Audio*

ISO/IEC 15938-5, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

ISO/IEC 23001-1, *Information technology — MPEG systems technologies; Binary MPEG format for XML*

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W3C Recommendation 26 November 2008, Extensible Markup Language (XML) 1.0 (Fifth Edition)
http://www.w3.org/TR/2008/REC-xml-20081126/

ITU-T Rec. T.81 | ISO/IEC 10918-1, *Information technology — Digital compression and coding of continuous-tone still images: Requirements and guidelines*

ITU-T Rec. T.800 | ISO/IEC 15444-1, *Information technology — JPEG 2000 image coding system: Core coding system*

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
JPEG
image coding format compliant to ISO/IEC 10918-1

3.2
JPEG 2000
image coding format compliant to ISO/IEC 15444-1

3.3
resource
encoded image codestream

3.4
external resource
resource which is available outside of the current file

3.5
codestream
entity of a resource

3.6
metadata
entity of descriptive data of image data

3.7
MPEG-7
metadata schema compliant to ISO/IEC 15938, parts 1 to 5

3.8
BiM
metadata encoding method compliant to ISO/IEC 23001-1

3.9
XML
language to define metadata or its instance standardized by W3C (the World Wide Web Consortium)

4   Symbols and abbreviated terms

JPEG   Joint Photographic Experts Group

MPEG   Moving Picture Experts Group

BiM   Binary MPEG format for XML

XML   eXtensible Markup Language

5   File format

The JPSearch data interchange file format for collection-level and item-level metadata encapsulates all the collection-level and item-level metadata into a valid XML descriptor in a single text-based format. The aim is to enable easy exchange of metadata between repositories.

In this case, the collection-level and item-level metadata should follow the interchange format schema as defined in 7.3.

Besides a plain-text XML representation, in this case the descriptive metadata can optionally be stored using BiM.

6   Resource

Only JPEG-conforming, JPEG 2000-conforming and JPSearch-conforming code-streams may be used as internal or external resources in the JPSearch data interchange file format. Internal JPEG and/or JPEG 2000 and/or JPSearch Part 4 resources shall be stored in InlineMedia of ImageDataType. Alternatively, external JPEG and/or JPEG 2000 and/or JPSearch Part 4 resources can be identified by MediaUri or ImageDataType.

As a special case, a file can have all images defined as external resources. As a result, the file only contains metadata (collection-level and item-level).

7   Schema and metadata

7.1   General

This Clause specifies the metadata which is supported by the JPSearch data interchange format.

7.2   JPSearch collection metadata schema

7.2.1   Introduction

This Clause specifies the schema that facilitates the composition of XML metadata descriptions about image collections, for the purpose of information exchange between image repositories. The following description tools are specified: The type hierarchy of the schema and the root element.

7.2.2   Wrapper of the schema

The syntax defined in ISO/IEC 24800-2 assumes the following schema wrapper.

```
<schema xmlns:jpcls="urn:jpeg:jpsearch:schema:collections:2009"
xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:jpcs="urn:jpeg:jpsearch:schema:coremetadata:2009"
targetNamespace="urn:jpeg:jpsearch:schema:collections:2009"
elementFormDefault="qualified" attributeFormDefault="unqualified">
   <import namespace="urn:jpeg:jpsearch:schema:coremetadata:2009"
schemaLocation="jpcore.xsd"/>
```

7.2.3 Root element (`Collections`)

7.2.3.1 Introduction

The `Collections` element serves as the root element of the collection metadata schema. The root element shall be used as the topmost element when collections metadata appears in an independent way. This applies when collections metadata appears within the top-level `metabox` of the binary file format.

7.2.3.2 Syntax

```
<element name="Collections" type="jpcls:CollectionsType"/>
```

7.2.3.3 Semantic

Semantics of the `Collections` element：

Name	Definition
Collections	Serves as the root element of the collection metadata schema. The root element shall be used as the topmost element when collections metadata appears in an independent way. This applies when collections metadata appears within the top-level metabox of the binary file format.

7.2.3.4 Example

An example for the `Collections` element is provided below:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<Collections xmlns="urn:jpeg:jpsearch:schema:collections:2009"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:jpcs="urn:jpeg:jpsearch:schema:2009"
xsi:schemaLocation="urn:jpeg:jpsearch:schema:2009
JPSearch_core_schema_v_sardinia.xsd urn:jpeg:jpsearch:schema:collections:2009
JPSearch_collections_schema.xsd" xsi:type="CollectionsType">
  <Collection>
    <Identifier>Col1</Identifier>
    <CreationDate>2009-07-16T10:32:52</CreationDate>
    <ModfiedDate>2009-07-16T10:32:52</ModfiedDate>
    <Description>The collection number 1</Description>
    <WithinCollectionID>Col2</WithinCollectionID>
    <WithinCollectionID>Col3</WithinCollectionID>
  </Collection>
  <Collection>
    <Identifier>Col2</Identifier>
    <CreationDate>2009-07-16T10:32:52</CreationDate>
    <ModfiedDate>2009-07-16T10:32:52</ModfiedDate>
    <Description>The collection number 2</Description>
  </Collection>
  <Collection>
    <Identifier>Col3</Identifier>
    <CreationDate>2009-07-16T10:32:52</CreationDate>
    <ModfiedDate>2009-07-16T10:32:52</ModfiedDate>
    <Description>The collection number 3</Description>
  </Collection>
</Collections>
```

7.2.4 CollectionsType

7.2.4.1 Introduction

The `CollectionsType` type serves as the root element of the collection metadata part of the metadata interchange format schema.

7.2.4.2 Syntax

```
<complexType name="CollectionsType">
   <sequence>
      <element name="Collection" type="jpcls:CollectionType"
minOccurs="0" maxOccurs="unbounded"/>
   </sequence>
</complexType>
```

7.2.4.3 Semantic

Semantics of the `CollectionsType` type:

Name	Definition
CollectionsType	Serves as the root element of the collection metadata part of the metadata interchange format schema.

7.2.5 CollectionType

7.2.5.1 Introduction

The `CollectionType` type allows expressing metadata related to one image collection. It includes descriptive elements from the JPSearch Core Schema in ISO/IEC 24800-2.

7.2.5.2 Syntax

```
<complexType name="CollectionType">
   <sequence>
      <element name="Identifier" type="anyURI"/>
      <element name="Creators" type="jpcs:PersonNameType"
minOccurs="0" maxOccurs="unbounded"/>
      <element name="Modifiers" type="jpcs:PersonNameType"
minOccurs="0" maxOccurs="unbounded"/>
      <element name="CreationDate" type="dateTime"/>
      <element name="ModfiedDate" type="dateTime"/>
      <element name="Description" type="string"/>
      <element name="Keyword" type="string" minOccurs="0"
maxOccurs="unbounded"/>
      <element name="Title" type="string" minOccurs="0"/>
      <element name="WithinCollectionID" type="anyURI" minOccurs="0"
maxOccurs="unbounded"/>
      <element name="TrackIDRef" type="jpcls:int32"
maxOccurs="unbounded"/>
   </sequence>
</complexType>

<simpleType name="int32">
   <restriction base="nonNegativeInteger">
```

```
      <minInclusive value="0"/>
      <maxInclusive value="4294967295"/>
   </restriction>
</simpleType>
```

7.2.5.3   Semantic

Semantics of the `CollectionType` type：

Name	Definition
CollectionType	Specifies information for a collection.
Identifier	Describes an identifier of the collection in the form of a URI. The identifier must be unique.
Modifiers	Describes a modifier's name or a list of names who changed the original collection resulting in the creation of the collection (optional).
Creators	Describes a person's name or a list of the names who created the collection or made contributions in the creation of the collection (optional).
CreationDate	Describes the date when the collection is created.
ModfiedDate	Describes the date when the collection is modified.
Description	Specifies the content of the collection in the form of text.
Keyword	Describes a list of keywords that characterize the collection (optional).
Title	Describes the title of the collection (optional).
WithinCollectionID	Describes the identifier of another collection to which this collection belongs. Collections, as images, can also belong to 1 or more collections.
TrackIDRef	Describes the identifier for the tracks which belong to this specific collection

7.3   JPSearch XML metadata interchange format schema

7.3.1   Introduction

This Clause specifies the schema that facilitates the interchange of XML metadata descriptions about images and collections. The following description tools are specified: The type hierarchy of the schema and the root element.

7.3.2   Wrapper of the schema

The Syntax defined in this part assumes the following schema wrapper.

```
<schema xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:jpxif="urn:jpeg:jpsearch:jpxif:2009"
xmlns:jpcs="urn:jpeg:jpsearch:schema:coremetadata:2009"
xmlns:jpcls="urn:jpeg:jpsearch:schema:collections:2009"
targetNamespace="urn:jpeg:jpsearch:jpxif:2009" elementFormDefault="qualified">
  <import namespace="urn:jpeg:jpsearch:schema:coremetadata:2009"
schemaLocation="jpcore.xsd"/>
  <import namespace="urn:jpeg:jpsearch:schema:collections:2009"
schemaLocation="JPSearch_collections_schema.xsd"/>
```

7.3.3   Root element (`ImageRepository`)

7.3.3.1   Introduction

The `ImageRepository` element serves as the root element of the XML metadata interchange format schema.

7.3.3.2   Syntax

```
<element name="ImageRepository" type="jpxif:ImageRepositoryType"/>
```

7.3.3.3   Semantic

Semantics of the `ImageRepository` element：

Name	Definition
ImageRepository	Serves as the root element of the XML metadata interchange format schema.

7.3.3.4   Example

An example for the `ImageRepository` element is provided below:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<ImageRepository xmlns="urn:jpeg:jpsearch:jpxif:2009"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:jpcs="urn:jpeg:jpsearch:schema:2009"
xmlns:jpcls="urn:jpeg:jpsearch:schema:collections:2009"
xsi:schemaLocation="urn:jpeg:jpsearch:jpxif:2009
JPSearch_XML_data_interchange_format.xsd urn:jpeg:jpsearch:schema:2009
JPSearch_core_schema_v_sardinia.xsd urn:jpeg:jpsearch:schema:collections:2009
JPSearch_collections_schema.xsd">
  <CollectionsMediaBox>
    <Collections>
      <jpcls:Collection>
        <jpcls:Identifier>Col1</jpcls:Identifier>
        <jpcls:CreationDate>2009-07-16T10:32:52</jpcls:CreationDate>
        <jpcls:ModfiedDate>2009-07-16T10:32:52</jpcls:ModfiedDate>
        <jpcls:Description>The collection number 1</jpcls:Description>
        <jpcls:WithinCollectionID>Col2</jpcls:WithinCollectionID>
        <jpcls:WithinCollectionID>Col3</jpcls:WithinCollectionID>
      </jpcls:Collection>
      <jpcls:Collection>
        <jpcls:Identifier>Col2</jpcls:Identifier>
        <jpcls:CreationDate>2009-07-16T10:32:52</jpcls:CreationDate>
        <jpcls:ModfiedDate>2009-07-16T10:32:52</jpcls:ModfiedDate>
        <jpcls:Description>The collection number 2</jpcls:Description>
      </jpcls:Collection>
      <jpcls:Collection>
        <jpcls:Identifier>Col3</jpcls:Identifier>
        <jpcls:CreationDate>2009-07-16T10:32:52</jpcls:CreationDate>
        <jpcls:ModfiedDate>2009-07-16T10:32:52</jpcls:ModfiedDate>
        <jpcls:Description>The collection number 3</jpcls:Description>
      </jpcls:Collection>
    </Collections>
  </CollectionsMediaBox>
  <Image>
```

```
    <ImageData>
      <FilePath>Image1.jpg</FilePath>
    </ItemData>
    <ImageMetadata>
      <JPSearchImageDescription>
        <jpcs:Identifier>Image1</jpcs:Identifier>
        <jpcs:Publisher>
          <jpcs:PersonName>
            <jpcs:GivenName>Tester</jpcs:GivenName>
          </jpcs:PersonName>
        </jpcs:Publisher>
        <jpcs:CreationDate>2009-07-16T10:32:52</jpcs:CreationDate>
        <jpcs:ModfiedDate>2009-07-16T10:32:52</jpcs:ModfiedDate>
        <jpcs:Description>Image number 1</jpcs:Description>
        <jpcs:Source>
          <jpcs:RefID/>
          <jpcs:Relation/>
        </jpcs:Source>
        <jpcs:PreferenceValue>1</jpcs:PreferenceValue>
        <jpcs:Rating/>
      </JPSearchImageDescription>
    </ImageMetadata>
  </Image>
  <Image>
    <ImageData>
      <FilePath>Image1.jpg</FilePath>
    </ImageData>
    <ImageMetadata>
      <JPSearchImageDescription>
        <jpcs:Identifier>Image1</jpcs:Identifier>
        <jpcs:Publisher>
          <jpcs:PersonName>
            <jpcs:GivenName>Tester</jpcs:GivenName>
          </jpcs:PersonName>
        </jpcs:Publisher>
        <jpcs:CreationDate>2009-07-16T10:32:52</jpcs:CreationDate>
        <jpcs:ModfiedDate>2009-07-16T10:32:52</jpcs:ModfiedDate>
        <jpcs:Description>Image number 1</jpcs:Description>
        <jpcs:RightsDescription/>
        <jpcs:Source>
          <jpcs:RefID/>
          <jpcs:Relation/>
        </jpcs:Source>
        <jpcs:PreferenceValue>1</jpcs:PreferenceValue>
        <jpcs:Rating/>
        <jpcs:OriginalImageIdentifier/>
      </JPSearchImageDescription>
    </ImageMetadata>
  </Image>
</ImageRepository>
```

7.3.4   ImageRepositoryType

7.3.4.1   Introduction

The ImageRepositoryType type allows expressing metadata related to images and image collections. It is composed by zero-to-many CollectionsMetadata elements, and one-to-many Image elements.