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Graphic technology — Extensible metadata platform (XMP) specification —

Part 3: JSON-LD serialization of XMP

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Contents

Page

Foreword

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This document was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 2, *Document file formats, EDMS systems and authenticity of information*.

A list of all parts in the ISO 16684 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The extensible metadata platform (XMP) was introduced by Adobe Systems Incorporated in 2001 and has since established itself as a critical technology for improving business efficiency in many industries. The current serialization of XMP model is available in RDF/XML format as described in ISO 16684-1. This document provides a complete specification about how XMP can be serialized to JSON-LD.

JSON-LD is a lightweight syntax to serialize Linked Data in JSON (RFC4627). Its design allows existing JSON to be interpreted as linked data with minimal changes. It is also designed to be usable as RDF. JSON-LD can distinguish between values which are simple strings and internationalized resource identifiers (IRI). JSON itself has no built-in support for hyperlinks. Types of values can be indicated by an IRI in JSON-LD. But this cannot be done naturally in JSON. It provides the ability to annotate strings with their language.

Users of this document are cautioned that they are expected to be familiar with the documents listed as normative references and the terms used within those documents.[1)]

1) The PDF Association maintains an ongoing series of application notes for guiding developers and users of this document. It also retains copies of the specific non-ISO normative references of this document which are publicly available electronic documents.

Graphic technology — Extensible metadata platform (XMP) specification —

Part 3: JSON-LD serialization of XMP

1 Scope

This document defines how the XMP data model can be serialized to JSON-LD.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

JSON-LD 1.1, A JSON-based Serialization for Linked Data, W3C Recommendation, 16 July 2020, https://www.w3.org/TR/json-ld11

BCP-47, Tags for Identifying Languages. A. Phillips; M. Davis. IETF. September 2009. IETF Best Current Practice. https://tools.ietf.org/html/bcp47

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 XMP – JSON-LD serialization

4.1 Namespace prefix serialization

Many of the terms used in this document come from JSON-LD 1.1.

According to ISO 16684-1, all names in XMP are XML expanded names, consisting of a namespace uniform resource identifier (URI) and a local name. The shortcut term of the namespace URI is defined inside the *@context* key in a JSON-LD document. All JSON-LD serializations of XMP shall contain a *@context* key.

EXAMPLE 1 XMP serialized as RDF/XML and its corresponding serialized JSON-LD with namespace prefixes.

Serialized XMP Packet in RDF/XML

```
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xmp="http://ns.adobe.com/xap/1.0/"
    xmlns:tiff="http://ns.adobe.com/tiff/1.0/">
    <rdf:Description rdf:about="">
            <xmp:Rating>4</xmp:Rating>
```

```
            <tiff:Orientation>1</tiff:Orientation>
    </rdf:Description>
</rdf:RDF>
```

Serialized XMP Packet in JSON-LD

```
{
    "@context": {
        "xmp": "http://ns.adobe.com/xap/1.0/",
        "tiff": "http://ns.adobe.com/tiff/1.0/"
    },
    "xmp:Rating": "4",
    "tiff:Orientation":"1",
    "@id": ""
}
```

Contexts can either be directly embedded into the document or be referenced. It is also possible to have more than one context at different points in a document. The set of contexts defined within a specific JSON object are referred to as local contexts.

NOTE The value of the *@context* key can either be a simple string (mapping the term to an IRI) or a JSON object.

If all the contexts in EXAMPLE 1 were combined into a single file that could be retrieved at the *@context* link shown in EXAMPLE 2 below, it can be referenced in the JSON-LD by adding a single line thus allowing the JSON-LD document to be expressed much more concisely.

EXAMPLE 2 Use of externally referenced *@context*.

```
{
    "@context": "http://www.example.com/contexts/context1.jsonld",
    "xmp:Rating": 4,
    "tiff:Orientation": 1,
    "@id": ""
}
```


4.2 Property Names in JSON-LD

Property names are represented as keys in JSON-LD document. These keys shall be of the form compact internationalized resource identifier (IRI). Compact IRI in JSON-LD is in the form of *prefix:suffix* where *prefix* refers to the namespace term defined in the context and *suffix* is local name in that namespace.

4.3 rdf:about serialization in JSON-LD as @id

ISO 16684-1:2019, 6.1 specifies that an XMP packet may contain a URI, called the AboutURI, that identifies the resource that the packet describes. Additionally, ISO 16684-1:2019, 7.4 adds that if the XMP data model has an AboutURI, that same URI shall be the value of an *rdf:about* attribute in each top-level *rdf:Description* element. Otherwise, the *rdf:about* attributes for all top level rdf:Description elements shall be present with an empty value. The *rdf:about* attribute shall not be used in more deeply nested *rdf:Description* elements.

EXAMPLE Serialized XMP and its corresponding serialized JSON-LD with AboutURI.

Serialized XMP Packet in RDF/XML

```
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xmp="http://ns.adobe.com/xap/1.0/">
    <rdf:Description rdf:about="http://www.example.com/abouturiEg/">
        <xmp:Rating>4</xmp:Rating>
    </rdf:Description>
</rdf:RDF>
```


Serialized XMP Packet in JSON-LD

```
{
    "@context": {
        "xmp": "http://ns.adobe.com/xap/1.0/"
    },
    "@id": "http://www.example.com/abouturiEg/",
    "xmp:Rating": 4
}
```

NOTE It is possible for an XMP packet to not contain an AboutURI and not have a physical association with the resource. Instead, there can be an external means of association.

If there is no AboutURI present (this can occur as XMP tolerates missing *rdf:about* attribute for compatibility with very early XMP), then an empty *@id* shall be included in the root document.

4.4 Use of @type JSON-LD keyword

JSON-LD has *@type* keyword that can be used to specify node type and value type. A node type specifies the type of thing that is being described. A value type specifies the data type of a particular value, such as an integer, a floating-point number or a date.

In the RDF/XML serialization, the value type is expressed by *rdf:datatype*. However, this attribute is not allowed in the JSON-LD serialization. The JSON-LD serialization allows for the use of *rdf:node* that corresponds to node type (ISO 16684-1:2019, 7.9.2.5). In addition, the *rdf:type* property can be used (but not a typed node, see ISO 16684-1:2019, 7.9.2.5).

EXAMPLE 1 Below is an example of *rdf:type* and its corresponding serialization in JSON-LD.

Serialized XMP Packet in RDF/XML:

```
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xe="http://ns.adobe.com/xmp-example/"
    xmlns:xmp="http://ns.adobe.com/xap/1.0/">
    <rdf:Description rdf:about="">
        <rdf:type rdf:resource="http://ns.adobe.com/xmp-example/myType"/>
        <xmp:Rating>3</xmp:Rating>
     </rdf:Description>
</rdf:RDF>
```


Serialized XMP Packet in JSON-LD

```
{
    "@context": {
        "xmp": "http://ns.adobe.com/xap/1.0/",
        "xe": "http://ns.adobe.com/xmp-example/"
    },
    "@id": "",
    "@type": "http://ns.adobe.com/xmp-example/myType",
    "xmp:Rating": 3
}
```

In RDF/XML serialization of XMP, the use of an inner typed node in XMP attaches an *rdf:type* qualifier to the containing element. The value of the *rdf:type* qualifier is a URI consisting of the typed node element's namespace URI concatenated with the local name. In the JSON-LD serialization, the equivalent of *rdf:type* is the *@type* keyword.

EXAMPLE 2 Inner typed node interpretation in XMP RDF/XML serialization.

```
<rdf:RDF
      xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
      xmlns:xe="http://ns.adobe.com/xmp-example/">
      <rdf:Description>
            <xe:Prop2>
              <rdf:Description>
                 <rdf:type
                rdf:resource="http://ns.adobe.com/xmp-example/myType"/>
                 <rdf:value rdf:parseType="Resource">
                      <xe:Field>value</xe:Field>
                 </rdf:value>
              </rdf:Description>
          </xe:Prop2>
      </rdf:Description>
</rdf:RDF >
```

Corresponding JSON-LD serialization

```
{
    "@context": {
        "xe": "http://ns.adobe.com/xmp-example/",
        "rdf":"http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    },
    "xe:Prop2": {
        "@type": "http://ns.adobe.com/xmp-example/myType",
        "rdf:value": {
            "xe:Field": "value"
        }
    }
}
```


Instead of *@type*, it is also acceptable to use *rdf:type* for consistency with the XML serialization.

EXAMPLE 3 Explicit *rdf:type* field in an XMP structure.

```
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xe="http://ns.adobe.com/xmp-example/">
    <rdf:Description>
    <!-- In XMP this is not related to the Typed Node usage. -->
        <xe:Prop3>
        <rdf:Description>
            <rdf:type
                rdf:resource="http://ns.adobe.com/xmp-example/myType"/>
            <xe:Field>value</xe:Field>
        </rdf:Description>
        </xe:Prop3>
    </rdf:Description>
</rdf:RDF>
```


Corresponding JSON-LD serialization

```
{
  "@context": {
    "xe": "http://ns.adobe.com/xmp-example/",
    "rdf":"http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  },
  "xe:Prop3": {
    "rdf:type": "http://ns.adobe.com/xmp-example/myType",
    "xe:Field": "value"
  }
}
```