DRAFT INTERNATIONAL STANDARD
ISO/DIS 16684-3

ISO/TC **171**/SC **2**

Secretariat: **ANSI**

Voting begins on:
2020-08-11

Voting terminates on:
2020-11-03

Graphic technology — Extensible metadata platform (XMP) specification —

Part 3:
JSON-LD serialization of XMP

Partie 3: Plate-forme de métadonnées extensibles (XMP)

ICS: 35.240.30; 37.100.99

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 16684-3:2020(E)

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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 ISO documents 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).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 171, Document management applications, Subcommittee SC 2, Document file formats, EDMS systems and authenticity, Working Group WG 12, Metadata.

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 part of ISO 16684 are cautioned that they are expected to be familiar with the documents listed as normative references and the terms used within those documents.

The PDF Association may maintain an ongoing series of application notes for guiding developers and users of this part of ISO 16684. These application notes are available at http://www.pdfa.org/. The PDF Association will also retain copies of the specific non-ISO normative references of this part of ISO 16684 which are publicly available electronic documents.

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Graphic technology — Extensible metadata platform (XMP) specification —

Part 3:
JSON-LD serialization of XMP

1   Scope

This document defines how XMP data model can be serialized to JSON-LD. Serialized XMP packet shall follow XMP specifications.

This document does not specify the following:

— specific processes for converting paper or electronic documents to the PDF file format;

— specific technical design, user interface implementation, or operational details of rendering;

— specific physical methods of storing these documents such as media and storage conditions;

— methods for validating the conformance of PDF files or PDF processors;

— required computer hardware and/or operating system.

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.

ISO 16684-1:2019, *Graphic technology — Extensible metadata platform (XMP) — Part 1: Data model, serialization and core properties*

RFC 8259, *The JavaScript Object Notation (JSON) Data Interchange Format, IETF, 2017*, https://tools.ietf .org/html/rfc8259

JSON-LD 1.1, A JSON-based Serialization for Linked Data, W3C Recommendation, 07 May 2020, https:// www.w3.org/TR/json-ld11

RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax, IETF, 2005*, https://tools.ietf.org/html/ rfc3986

3   Terms and definitions

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

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

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

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

3.1
@context
Used to define the short-hand names that are used throughout a JSON-LD document

[SOURCE: JSON-based Serialization for Linked Data, Section 5.1]

3.2
@id
Used to uniquely identify things that are being described in the document with IRIs or blank node identifiers

[SOURCE: JSON-based Serialization for Linked Data, Section 5.3]

3.3
IRI
Internationalized Resource Identifiers

[SOURCE: JSON-based Serialization for Linked Data, Section 5.2]

3.4
JSON Object
object structure is represented as a pair of curly brackets surrounding zero or more key-value pairs

[SOURCE: RFC4627]

3.5
@language
Used to specify the language for a particular string value or the default language of a JSON-LD document

[SOURCE: JSON-based Serialization for Linked Data, Section 6.9]

3.6
@list
Used to express an ordered set of data

[SOURCE: JSON-based Serialization for Linked Data, Section 6.11]

3.7
@set
Used to express an unordered set of data and to ensure that values are always represented as arrays

[SOURCE: JSON-based Serialization for Linked Data, Section 6.11]

3.8
@type
Used to set the data type of a node or typed value

[SOURCE: JSON-based Serialization for Linked Data, Section 6.4]

3.9
URI
Uniform Resource Identifier
compact sequence of characters that identifies an abstract or physical resource

[SOURCE: IETF RFC 3986]

4   XMP – JSON-LD Serialization

4.1   Namespace prefix serialization

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

EXAMPLE   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. Assuming the context document in the previous example can be retrieved at http://www.example.com/contexts/context1.jsonld, it can be referenced by adding a single line and allows a JSON-LD document to be expressed much more concisely. 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.

EXAMPLE   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 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 per the XMP Specification part 1, "An XMP packet may contain a URI, called the AboutURI, that identifies the resource that the packet describes. 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's not any AboutURI present (this might occur as XMP tolerates missing *rdf:about* attribute for compatibility with very early XMP) then 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, value type is expressed by *rdf:datatype*, however this attribute is not allowed in the JSON-LD serialization. The JSON-LD serialization does allows 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   Below is an example of *rdf:type* and it's 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   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   An 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>
```

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