
**Graphic technology — Extensible
metadata platform (XMP)
specification —**

**Part 3:
JSON-LD serialization of XMP**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO 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).

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 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⁾

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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.

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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": "https://standards.iteh.ai/catalog/standards/sist/6dd32fe8-8b35-4cdb-92fb-4deb92863702/iso-16684-3-2021",
  "@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"
    }
  }
}
```

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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. [ISO 16684-3:2021](https://standards.iteh.ai/catalog/standards/sist/6dd32fe8-8b35-4cdb-92fb-4deb92863702/iso-16684-3-2021)

```
<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"
  }
}
```

4.5 XMP property forms serialization in JSON-LD

4.5.1 General

As per ISO 16684-1, values in the XMP data model have one of three forms:

- simple;
- structure;
- array.

The array form can be further classified as: unordered array, ordered array and alternative array. The fields in structures and the items in arrays can have any value form. There is no fixed bound on the complexity of XMP data modelling.

[Subclauses 4.5.2](#) to [4.5.5](#) present the rules which shall be followed by conforming applications while serializing any XMP to JSON-LD.

4.5.2 Simple valued XMP Properties

A simple value may be either a string of unicode text as defined in ISO/IEC 10646, a number, or one of the three literal names defined in RFC 8259.

Any string value may be empty. A non-empty string value may be a URI, which when used as the value of the *@id* key shall be interpreted as an IRI.

EXAMPLE 1 Serialization for non-URI simple value in RDF/XML format and JSON-LD format.

Serialized XMP 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="">
    <xmp:Rating>4</xmp:Rating>
  </rdf:Description>
</rdf:RDF>
```

Serialized XMP in JSON-LD

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

EXAMPLE 2 Serialization for URI simple value in RDF/XML format and JSON-LD format.

Serialized XMP 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="">
    <xmp:BaseURL rdf:resource="https://www.adobe.com/">
  </rdf:Description>
</rdf:RDF>
```

Serialized XMP in JSON-LD