

~~ISO/DIS~~ **ISO/FDIS 16684-4:2023(E)**

ISO TC 171/SC 2/WG 12

Secretariat: ANSI

Date: 2023-10-1408-21

Graphic technology — Extensible metadata platform (XMP) specification — Part 4: Use of XMP for semantic units

Style Definition: Heading 1: Indent: Left: 0 pt, First line: 0 pt, Tab stops: Not at 21.6 pt

Style Definition: Heading 2: Font: Bold, Tab stops: Not at 18 pt

Style Definition: Heading 3: Font: Bold

Style Definition: Heading 4: Font: Bold

Style Definition: Heading 5: Font: Bold

Style Definition: Heading 6: Font: Bold

Style Definition: ANNEX

Style Definition: zzCopyright

Style Definition: AMEND Terms Heading: Font: Bold

Style Definition: AMEND Heading 1 Unnumbered: Font: Bold

Style Definition: IneraTableMultiPar: Font: Not Bold, Justified

Formatted: Font: Bold

Formatted: Font: Bold

Formatted: Font: Bold

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/FDIS 16684-4

<https://standards.iteh.ai/catalog/standards/sist/84bb618b-50ba-4410-9803-ce0ec503f399/iso-fdis-16684-4>

Edited DIS - MUST BE USED FOR FINAL DRAFT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ~~ISO's~~ISO's member body in the country of the requester.

ISO ~~copyright office~~Copyright Office

CP 401 • ~~Ch. de Blandonnet 8~~

CH-1214 Vernier, Geneva

Phone: +41 22 749 01 11

~~Email: copyright@iso.org~~

Email: copyright@iso.org

Website: ~~www.iso.org~~www.iso.org

Published in Switzerland.

Formatted: Default Paragraph Font

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Default Paragraph Font

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/FDIS 16684-4

<https://standards.iteh.ai/catalog/standards/sist/84bb618b-50ba-4410-9803-ce0ec503f399/iso-fdis-16684-4>

Contents

Foreword..... **iv**

Introduction..... **v**

1 Scope..... **1**

2 Normative references..... **1**

3 Terms and definitions..... **1**

4 Semantic unit..... **3**

4.1 General..... **3**

4.2 Types of semantic unit..... **3**

5 Defining and referencing semantic unit..... **4**

5.1 Defining semantic unit with target resource(s)..... **4**

5.2 Required Keywords..... **5**

5.3 Simple valued XMP: selecting a target source resource..... **5**

5.4 Array valued XMP: selecting a set of specific resources..... **5**

5.4.1 General..... **5**

5.4.2 Array values..... **6**

5.4.3 Structure valued XMP properties..... **6**

5.5 Identifying and dereferencing semantic unit..... **6**

6 Serialization..... **6**

Annex A (informative) Use case – digitized books..... **7**

A.1 Background..... **7**

A.2 Goal..... **7**

Annex B..... **13**

Bibliography	14
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Semantic unit	3
4.1 General	3
4.2 Types of semantic units	3
5 Defining and referencing semantic unit	6
5.1 Defining semantic units with target resources	6
5.2 Required Keywords	7
5.3 Simple valued XMP: selecting a target source resource	7
5.4 Array valued XMP: selecting a set of specific resources	7
5.4.1 General	7
5.4.2 Array values	7
5.4.3 Structure valued XMP properties	8
5.5 Identifying and dereferencing semantic unit	8
6 Serialization	8
Annex A (informative) Use case – Digitized books	9
Annex B (informative) Difference between XMP and the Web Annotation Model	14
Bibliography	15

ISO/FDIS 16684-4

<https://standards.iteh.ai/catalog/standards/sist/84bb618b-50ba-4410-9803-ce0ec503f399/iso-fdis-16684-4>

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.

Formatted: English (United Kingdom)

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).

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

~~Attention is drawn~~ISO draws attention to the possibility that ~~some of the elements~~implementation of this document may ~~be involve the subject~~use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. 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)~~.

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

Formatted: English (United Kingdom)

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.

Formatted: English (United Kingdom)

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.

Formatted: Pattern: Clear

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.

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Introduction

Traditional concepts and uses of metadata have been applied to describe a file or a collection, but this approach cannot meet the needs of flexible, sub-file and across-file level information exchange and sharing. Researchers, publishers, readers and machines require new approaches to describe content in flexible and multi-faceted ways for data sharing and data exchange (e.g. chapter, figure, image, table, formula). Specifically, in the linked data (either open or closed) web environment, any piece of information can be described, referenced and linked with or without relationships with any other data, objects, and/or files.

By implementing this document, textual and non-textual content can be described, used and shared at an atomic level, file level and across-file level. This information can be used for multiple purposes, including content access, digital preservation, scientific research and publishing. Recent developments in computer vision and machine learning make it possible to create, link and capture semantics from documents, videos and audios. Machines can learn and create meaningful metadata using a variety of artificial intelligence (AI) machine learning models. This enhances existing resources description and creates new opportunities in content generation, content use and content re-use. For instance, the general public benefits from semantic-rich content through enhanced knowledge access, discovery and integration (e.g., see the use cases in the Annex A), while scholars can utilize semantic-rich content for content discovery, integration and scholarly communication. For business, the availability of semantic-rich content creates new opportunities for lower cost, higher productivity, and better user satisfaction. Machines can also utilize semantic-rich content and metadata for a variety of purposes.

Formatted: Pattern: Clear

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/FDIS 16684-4

<https://standards.iteh.ai/catalog/standards/sist/84bb618b-50ba-4410-9803-cc0ec503f399/iso-fdis-16684-4>

Graphic technology — Extensible metadata platform (XMP) — Part 4: Use of XMP for semantic units

Formatted: Font: Bold

1 Scope

This document:

- a) introduces the concept of the semantic unit (SU);
- b) provides requirements and guidance on how to define the target resource(s) in an SU by adopting the “target” syntax from the Web Annotation Model;
- c) provides requirements and guidance on the extensible metadata platform (XMP) serialization syntaxes for SU.

This document broadens the concept of XMP specified in ISO 16684-1 so that XMP can be used to describe an SU. A new flexible way of defining and describing SUs aims to bring innovation to textual and non-textual content, metadata, linked data, big data and artificial intelligence.

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: Pattern: Clear

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

Formatted: Pattern: Clear

Formatted: Pattern: Clear

ISO 16684-3:2021, Graphic technology — Extensible metadata platform (XMP) specification — Part 3: JSON-LD serialization of XMP

Formatted: Tab stops: 19.85 pt, Left + 39.7 pt, Left + 59.55 pt, Left + 79.4 pt, Left + 99.25 pt, Left + 119.05 pt, Left + 138.9 pt, Left + 158.75 pt, Left + 178.6 pt, Left + 198.45 pt, Left

RFC 9259, The JavaScript Object Notation (JSON) Data Interchange Format, IETF, 2017,

Formatted: Pattern: Clear

Formatted: Pattern: Clear

https://tools.ietf.org/html/rfc9259

JSON-LD 1.1, A JSON-based Serialization for Linked Data, W3C Recommendation, 16 January 2014,

Formatted: Pattern: Clear

Formatted: Pattern: Clear

https://www.w3.org/TR/json-ld/

RDF 1.1 Concepts and Abstract Syntax, W3C, 25 February 2014, http://www.w3.org/TR/rdf11-concepts/

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Web Annotation Data Model, W3C Recommendation, 2017, https://www.w3.org/TR/annotation-model/https://www.w3.org/TR/annotation-model/

Formatted: Pattern: Clear

Formatted: Pattern: Clear

3 Terms and definitions

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

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

Formatted: Justified

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: Font: Not Italic

Formatted: Font: Cambria

Formatted: Default Paragraph Font, English (United Kingdom)

ISO/DIS/EDIS 16684-4:2023(E)

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

Formatted: Default Paragraph Font, English (United Kingdom)

3.1

audio

frequency corresponding to a sinusoidal sound wave audible to the normal human ear (from about 16 Hz to 16 kHz)

Formatted: TermNum, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

[SOURCE: IEC ref 60050-702: 1992, 702-01-08]

Formatted: std_publisher

Note 1 to entry: Audio content is primarily intended to be heard. Alternatively, it can be described by other expressions such as text, image, and video.

Formatted: std_section

3.2

image

stored description of a graphic picture along with metadata, which is primarily intended to be seen

Note 1 to entry: Alternatively, it can be described by other content expressions such as text, audio, and video.

3.3

dataset

stored description of sets of data along with metadata, which is primarily intended to be processed by software

3.4

external resource

resource which is available outside of the current one

Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Note 1 to entry: It is de-referenceable from its ~~IRI~~ Internationalized Resource Identifier (IRI).

3.5

selector

~~selector is method~~ used to select and ~~to~~ describe the desired segment(s) from the source resource(s)

Note 1 to entry: The nature of a selector will be dependent on the types of resource, as the methods to select segments from various media-types will differ. Multiple selectors can be given to describe the same segment in different ways.

[SOURCE: Web Annotation Data Model, Section 4.2]

Note 2 to entry: See W3C Recommendation: 2017. 4.2 for further information.

3.6

semantic unit

SU
user-defined piece of information (content) consisting of one or more target(s) resources, which is logically, semantically or structurally separated from other information and can be meaningfully described as a unit

Note 1 to entry: An SU may be described by one or more extensible metadata platform (XMP) packets.

Note 2 to entry: An SU can be any piece of information (e.g. character, word, phrase, sentence, paragraph, chapter) across any information container (e.g. a file).

Note 3 to entry: An SU can be one of the following representations depending on its content.

— For content interpreted by visual systems (e.g. documents, maps), it can be an area containing content such as characters, figures, tables, images, and formulas.

- For content interpreted by hearing and/or visual systems (e.g. audio, video), it can be the length of starting and stopping time, or data containing such content.
- For content interpreted by smell, it can be the smell data (e.g. location, timestamp, chemical data), and/or interpretations of the smell.
- For content not sensible beyond the five human senses, it can be the data and/or its derivatives.

3.7

target

~~target~~ resource, which is a “specificResource” identified by “source”

[SOURCE: ~~Web Annotation Data Model, Section 4~~]

Note 1 to entry: See W3C Recommendation: 2017, Section 4 for further information.

3.8

text

sequence of characters or glyphs, or a visual representation thereof.

Note 1 to entry: Textual content is primarily intended to be read. Alternatively, it can be expressed by other means such as *audio* (3.1), *image* (3.2), or *video* (3.10) with metadata.

3.9

user

person or machine who defines, describes, and/or uses *SU* a semantic unit (3.6)

3.10

video

recording of an *image* (3.2) or set of images; content consists of moving images with or without *audio* (3.1)

4 Semantic unit

4.1 General

A semantic unit (SU) is a user-defined content that can be associated with one or more XMP packets. The user can apply this document to encapsulate sufficient information (including semantics) for the SU. ISO 16684-1 specified a way to declare an XMP packet but applies to the entire resource stored as a file.

This document specifies a way to create and to define any resource ~~which~~that can be a piece of information in a file container or cross-file boundary.

4.2 Types of semantic units

An SU can be any piece of information such as zero or more characters, an image, a video frame, a resource on the internet, or a combination of these.

An SU can be a content area inside an image, table, page, file, bitstream, and Internationalized Resource Identifier (IRI-). It can enable content cross images, tables, pages, files, bitstreams, and IRIs boundary (e.g. inside a file, outside a file, or a combination of multiple files), and a combination of the above.

An SU can include an ordered or unordered set of resources.

A metadata packet (i.e. XMP packet) for an SU can contain any type of metadata (descriptive, structural, technical, administrative) and data.

An SU can be independent or have relations with other SUs.

Examples include:

Formatted: Font: Italic

Formatted: Pattern: Clear

Formatted: Font: Italic

Formatted: Pattern: Clear

Formatted: Font: Italic

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: Font: Italic

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: Pattern: Clear

Formatted: No underline

ISO/DIS/IDIS 16684-4:2023(E)

— Digitized textual documents: (see Annex A):

Formatted: Pattern: Clear

— Images:

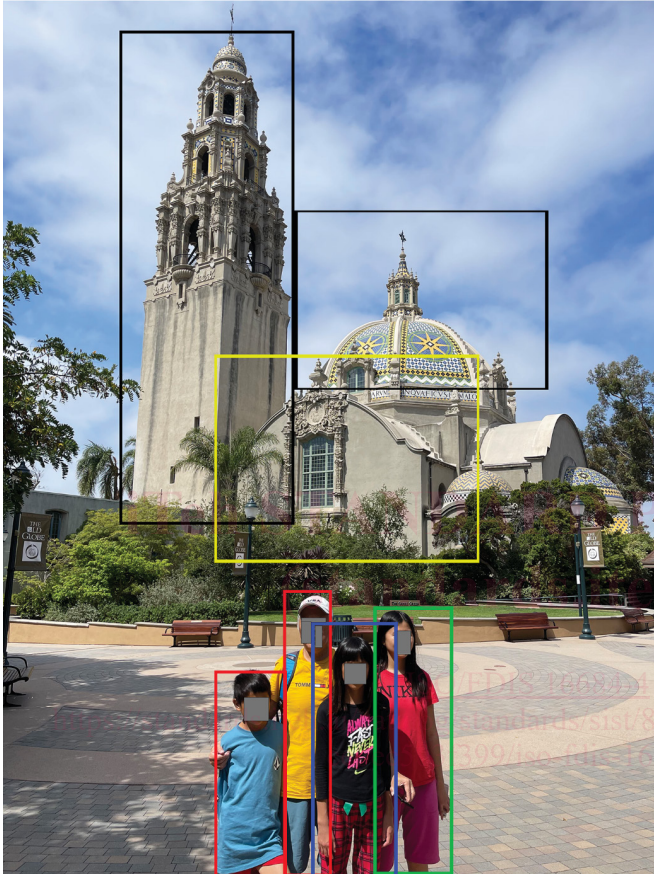
SUs defining parts of an image can be separated, connected, overlapped, and/or covered. Figure 1 shows that multiple SUs can be defined within a single image.

Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Formatted: Pattern: Clear



SOURCE: Reference [1], reproduced with permission from the author.



SOURCE: Reference [1], reproduced with permission from the author.

Figure 1— Multiple SUs in an image

- Several multimedia resources and related resources can be combined as part of one SU. For example, a sheet music fragment (see Figure 2) can be augmented with a video clip of a performance, or a ~~with~~ [webpage](#) describing the history of the piece.

Formatted: Default Paragraph Font, Font: Bold

Formatted: Pattern: Clear