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Information technology — Internet of media things —

Part 3: Media data formats and APIs

Technologies de l'information — Internet des objets media —

Partie 3: API et formats des données

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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 document 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 or www.iec.ch/members_experts/refdocs).

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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. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC 23093-3:2019), which has been technically revised.

The main changes are as follows:

— Addition of APIs for new MSensors, MActuators, and MAnalysers;

— Addition of data types for new MSensors, MActuators, and MAnalysers;

— Provide APIs to describe MPEG-V sensors and actuators;

— Addition of binary representation and its semantics.

A list of all parts in the ISO/IEC 23093 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

Introduction

The ISO/IEC 23093 series provides an architecture and specifies APIs and compressed representation of data flowing between media things.

The APIs for the media things facilitate discovering other media things in the network, connecting and efficiently exchanging data between media things. The APIs also support transaction tokens to access valuable functionalities, resources, and data from media things.

Media things related information consists of characteristics and discovery data, setup information from a system designer, raw and processed sensed data, and actuation information. The ISO/IEC 23093 series specifies input and output data formats for media sensors, media actuators, media storages, media analysers, etc. In addition, media analysers can process sensed data from media sensors to produce analysed data, and the media analysers can be cascaded to extract semantic information.

This document contains the tools to describe data exchanged between media things (e.g., media sensors, media actuators, media analysers, media storages) and their APIs. It addresses the normative aspects of the data and APIs for media things and also illustrates non-normative examples.

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of patents.

ISO and the IEC take no position concerning the evidence, validity, and scope of these patent rights.

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Information technology — Internet of media things —

Part 3:
Media data formats and APIs

1 Scope

This document specifies the syntax and semantics of description schemes to represent data exchanged by media things (e.g., media sensors, media actuators, media analysers, media storages). Moreover, it specifies the APIs to exchange these data between media things.

This document does not specify how sensing and analysing is carried out but defines the interfaces between the media things.

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

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

ISO/IEC 23005-2, *Information technology — Media context and control — Part 2: Control information*

ISO/IEC 23005-5, *Information technology — Media context and control — Part 5: Data formats for interaction devices*

ISO/IEC 23093-1, *Information technology — Internet of media things — Part 1: Architecture*

ISO/IEC 23093-2, *Information technology — Internet of media things — Part 2: Discovery and communication API*

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 23093-1 and ISO/IEC 23093-2 and the following 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

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

3.1.1
media actuator
MActuator
MThing that can actuate

3.1.2
media aggregator
MAggregator
MThing that contains multiple MThings

3.1.3
media analyser
MAnalyser
MThing that can analyse media or metadata and produce interpreted media, metadata, or commands

3.1.4
media manager
MManager
MThing that can register a list of MThings or be facilitated to search other MThings

3.1.5
media sensor
MSensor
MThing that can sense and produce media data

3.1.6
media storage
MStorage
MThing that can save media or metadata

3.2 Abbreviated terms

API application programming interface

MACV media actuator command vocabulary

MAOV media analyser output vocabulary

MSOV media sensor output vocabulary

MTDL media thing description language

SCDV sensor capability description vocabulary

XML extensible mark-up language

XSI XML streaming instructions

3.3 Schema documents

In the main text of this document, the syntax and semantics of data interfacing MThings are provided whenever possible as a single schema document.

In some cases, though, particularly for Clauses 6, 7, and 8, the syntax of data interfacing MThings is provided as a collection of schema snippets imbricated with other text. To form a valid schema document, users can gather these schema components in the same document with the schema wrapper provided at the head of the clause. For better readability, the relevant schema documents are supplied in https://standards.iso.org/iso-iec/23093/-3/ed-2/en/.

In all cases, each schema document has a `version` attribute, the value of which is "ISO/IEC 23093-3." Furthermore, an informative identifier is given as the value of the `id` attribute of the `schema` component. This identifier is non-normative and used as a convention in this document to reference another schema document. In particular, it is used for the `schemaLocation` attribute of the `include` and `import` schema components.

3.4 Use of prefixes

For clarity, throughout this document, consistent namespace prefixes are used.

"`xsi:`" prefix is not normative. It is a naming convention in this document to refer to an element of the `http://www.w3.org/2001/XMLSchema-instance` namespace.

"`xml:`" and "`xmlns:`" are normative prefixes defined in Reference [1]. The prefix "`xml:`" is by definition bound to "`http://www.w3.org/XML/1998/namespace`." The prefix "`xmlns:`" is used only for namespace bindings and is not itself bound to any namespace name.

All other prefixes used in either the text or examples of this document are not normative, e.g., "`mtdl:`", "`msov:`", "`macv:`", "`maov:`", "`mpeg7:`", "`scdv:`".

In particular, most informative examples in this document are provided as XML fragments without the typically required XML document declaration and, thus, miss a correct namespace binding context declaration. In these descriptions fragments, the different prefixes are bound to the `namespaces` as given in Table 1.

Table 1 — Mapping of prefixes to namespaces in examples and text

Prefix	Corresponding namespace
`scdv`	`urn:mpeg:mpeg-v:2017:01-SCDV-NS`
`mpeg7`	`urn:mpeg:mpeg7:schema:2004`
`mtdl`	`urn:mpeg:mpeg-IoMT:2021:01-MTDL-NS`
`msov`	`urn:mpeg:mpeg-IoMT:2021:01-MSOV-NS`
`macv`	`urn:mpeg:mpeg-IoMT:2021:01-MACV-NS`
`maov`	`urn:mpeg:mpeg-IoMT:2021:01-MAOV-NS`
`xsi`	`http://www.w3.org/2001/XMLSchema-instance`
`xsd`	`http://www.w3.org/2001/XMLSchema`

Unlike the informative descriptions examples, the normative specification of the syntax of tools in XML schema follows the namespace binding context defined in the relevant schema declaration, such as the one described in 6.2.