INTERNATIONAL STANDARD

ISO/IEC 23006-2

Third edition
2016-12-01

Information technology — Multimedia service platform technologies —

Part 2: MPEG extensible middleware (MXM) API

Technologies de l'information — Technologies de la plate-forme de services multimédia —

Partie 2: Intergiciel MPEG extensible (MXM) API

Reference number
ISO/IEC 23006-2:2016(E)

© ISO/IEC 2016



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, 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 member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms, definitions and abbreviated terms **1**
3.1 Terms and definitions 1
3.2 Abbreviated terms 3

4 Namespace conventions **4**

5 Common MXM interfaces and classes **7**

6 MPEG-M Engines **8**
6.1 General 8
6.2 Technology Engines 9
6.2.1 Digital Item Engine 9
6.2.2 MPEG-21 File Format Engine 9
6.2.3 REL Engine 10
6.2.4 IPMP Engine 11
6.2.5 GreenMetadata Engine 11
6.2.6 Media Framework Engine 12
6.2.7 Metadata Engine 16
6.2.8 Event Reporting Engine 16
6.2.9 Security Engine 17
6.2.10 Search Engine 18
6.2.11 Contract Engine 20
6.2.12 Overlay Engine 20
6.2.13 Sensory Effect Engine 21
6.2.14 Compact Descriptor for Visual Search Technology Engine 22
6.3 Protocol Engines 23
6.3.1 General 23
6.3.2 Base Protocol Engine 23
6.3.3 Authenticate Services APIs 25
6.3.4 Authorize Services APIs 25
6.3.5 Check With Services APIs 25
6.3.6 Create Services APIs 26
6.3.7 Deliver Services APIs 26
6.3.8 Describe Services APIs 26
6.3.9 Identify Services APIs 26
6.3.10 Negotiate Services APIs 27
6.3.11 Package Services APIs 27
6.3.12 Post Services APIs 27
6.3.13 Present Services APIs 27
6.3.14 Process Services APIs 27
6.3.15 Request Services APIs 27
6.3.16 Revoke Services APIs 28
6.3.17 Search Services APIs 28
6.3.18 Store Services APIs 29
6.3.19 Transact Services APIs 29
6.3.20 Verify Services APIs 29
6.4 MXM Orchestrator APIs 30
6.4.1 General 30
6.4.2 DID Engine Orchestrator APIs 30
6.4.3 Identify Content Engine Orchestrator APIs 30
6.4.4 Identify User Engine Orchestrator APIs 30

© ISO/IEC 2016 – All rights reserved

6.4.5 MF Orchestrator Engine APIs 30
Annex A (normative) **MXM Configuration** **31**
Bibliography **39**

 © ISO/IEC 2016 – All rights reserved

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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 on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This third edition cancels and replaces the second edition (ISO/IEC 23006-2:2013), which has been technically revised.

A list of all parts in the ISO/IEC 23006 series can be found on the ISO website.

© ISO/IEC 2016 – All rights reserved

Introduction

The ISO/IEC 23006 series is a suite of standards that has been developed for the purpose of enabling the easy design and implementation of media-handling value chains whose devices interoperate because they are all based on the same set of technologies, especially MPEG technologies, accessible from the middleware APIs, elementary services and aggregated services.

The ISO/IEC 23006 series is referred to as MPEG Extensible Middleware (MXM) in its first edition, and it specifies an architecture (ISO/IEC 23006-1), an API (ISO/IEC 23006-2), a conformance and reference software (ISO/IEC 23006-3) and a set of protocols which MXM Devices had to adhere (ISO/IEC 23006-4). It specifies also how to combine elementary services into aggregated services (ISO/IEC 23006-5).

The ISO/IEC 23006 series is subdivided into five parts:

Part 1 — Architecture: specifies the architecture that can be used as a guide to an MPEG-M implementation;

Part 2 — MPEG Extensible Middleware (MXM) Application Programming Interface (APIs) (this document): specifies the middleware APIs;

Part 3 — Conformance and Reference Software: specifies conformance criteria and a reference software implementation with a normative value;

Part 4 — Elementary Services: specifies elementary service protocols between MPEG-M applications;

Part 5 — Service Aggregation: specifies mechanisms enabling the combination of Elementary Services and other services to build Aggregated Services.

© ISO/IEC 2016 – All rights reserved

Information technology — Multimedia service platform technologies —

Part 2: MPEG extensible middleware (MXM) API

1 Scope

This document specifies a set of Application Programming Interfaces (called for short MXM APIs) so that MPEG-M Applications running on an MPEG-M Device can access the standard multimedia technologies contained in its Middleware as MPEG-M Engines, as specified by ISO/IEC 23006-1.

The MXM APIs belong to two classes:

— the MPEG-M Engine APIs, i.e. the collection of the individual MPEG-M Engine APIs providing access to a single MPEG technology (e.g. video coding) or to a group of MPEG technologies where this is convenient;

— the MPEG-M Orchestrator API, i.e. the API of the special MPEG-M Engine (called Orchestrator Engine) that is capable of creating chains of MPEG-M Engines to execute high-level application calls such as "Play a video", as opposed to the typically low-level MPEG-M Engine API calls.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 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:

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

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

3.1.1
Aggregated Service
service resulting from the combination of *Elementary Services* (3.1.2)

3.1.2
Elementary Service
basic unit of *service* (3.1.13)

3.1.3
content
Digital Item and its component elements, namely resources (e.g. media, scripts, executable), identifiers, descriptions (e.g. metadata) and *event* (3.1.6) reports

© ISO/IEC 2016 – All rights reserved

3.1.4
contract
set of metadata, *licenses* (3.1.8), promises and signers agreed by *users* (3.1.15) of a multimedia *value chain* (3.1.16), where a promise is a signed collection of statements about, e.g. obligations, prohibitions and assertions, and a signer is a user whose signature makes the contract valid

3.1.5
device
hardware/software or simply software apparatus that enables a *user* (3.1.15) to play a *role* (3.1.12) in multimedia *value chains* (3.1.16)

3.1.6
event
performance of a specified set of functions or operations

3.1.7
entity
one of the following elements in the multimedia *value chain* (3.1.16): *content* (3.1.3), *contract* (3.1.4), *device* (3.1.5), *event* (3.1.6), *license* (3.1.8), *service* (3.1.13), and *user* (3.1.15)

3.1.8
license
collection of authorizations, conditions and payment terms granted by a *user* (3.1.15) to other users

3.1.9
protocol
set of rules and data format used by two *devices* (3.1.5) to communicate

3.1.10
resource
individually identifiable asset or a sequence of assets

EXAMPLE Video or audio clip, a 3D synthetic scene, an image, a textual asset, a 2D LASeR scene, a web page, a single program or a full 24-hour programming of a TV broadcast, a script or executable, etc.

3.1.11
right
ability of a *user* (3.1.15) to perform an operation in the multimedia *value chain* (3.1.16)

3.1.12
role
ability of a *user* (3.1.15) to perform a set of operations in the multimedia *value chain* (3.1.16)

3.1.13
service
operation performed on an *entity* (3.1.7) by a *user* (3.1.15) on behalf of other users

3.1.14
service provider
user (3.1.15) offering *services* (3.1.13) to other users

3.1.15
user
participant in multimedia *value chains* (3.1.16)

3.1.16
value chain
collection of *users* (3.1.15), including creators, end users and *service providers* (3.1.14), that conform to this document

© ISO/IEC 2016 – All rights reserved

3.1.17
MPEG-M Application
application that runs on an *MPEG-M device* (3.1.18) and makes calls to the MPEG-M Application API and *MPEG-M Engine APIs* (3.1.20)

3.1.18
MPEG-M Device
device (3.1.5) equipped with a selected set of *MPEG-M Engines* (3.1.19)

3.1.19
MPEG-M Engine
collection of specific technologies that are bundled together to provide a specific functionality that is needed by *MPEG-M Applications* (3.1.17)

3.1.20
MPEG-M Engine API
API of a single *MPEG-M Engine* (3.1.19)

3.1.21
MPEG-M orchestrator API
API of the *MPEG-M Orchestrator Engine* (3.1.22)

3.1.22
MPEG-M Orchestrator Engine
special *MPEG-M Engine* (3.1.19) capable of creating chains of MPEG-M Engines

Note 1 to entry: It is also to set-up a sequence of connected MPEG-M Engines for the purpose of executing a high-level application call such as Play.

3.1.23
MPEG-M Technology
technology that is required to implement an MPEG-M functionality

3.2 Abbreviated terms

AIT	Advanced IPTV Terminal
AS	Aggregated Service
BBL	Bitstream Binding Language
BPMN	Business Process Model and Notation
CEL	Contract Expression Language
DI	Digital Item
DIA	Digital Item Adaptation
DID	Digital Item Declaration
DIDL	Digital Item Declaration Language
DII	Digital Item Identification
DIS	Digital Item Streaming
ER	Event Report
ERR	Event Report Request

© ISO/IEC 2016 – All rights reserved