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Information technology — Multimedia service platform technologies —

Part 1: Architecture

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

Partie 1: Architecture

Reference number
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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. www.iso.org/directives

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The committee responsible for this document is 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 23006-1:2011) which has been technically revised.

ISO/IEC 23006 consists of the following parts, under the general title *Information technology — Multimedia service platform technologies*:

— *Part 1: Architecture*

— *Part 2: MPEG extensible middleware (MXM) API*

— *Part 3: Conformance and reference software*

— *Part 4: Elementary services*

— *Part 5: Service aggregation*

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Introduction

ISO/IEC 23006 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.

ISO/IEC 23006 was referred to as MPEG Extensible Middleware (MXM) in its first edition, and it specifies an architecture (Part 1), an API (Part 2), a conformance and reference software (Part 3) and a set of protocols which MXM Devices had to adhere (Part 4).

ISO/IEC 23006 is referred to as Multimedia Service Platform Technologies (also abbreviated as MPEG-M) in its second edition, and it conserves the architecture and design philosophy of the first edition, while stressing the Service Oriented Architecture character. It also specifies how to combine elementary services into aggregated services (Part 5).

This second edition has been specified to address the demand of service specification for an advanced IPTV terminal (AIT). It also aims at leveraging on advanced technologies to bring into IPTV services the buoyancy of new exciting initiatives – sometimes assembling millions of users in a fortnight – that pop up almost every day with new features such as open APIs and the possibility for third parties to provide applications to those APIs.

The scope of the MPEG-M is to support the service providers' drive to deploy innovative multimedia services by identifying a set of Elementary Services (ESs) and defining the corresponding set of protocols and APIs to enable any user in an MPEG-M value chain to access those services in an interoperable fashion. Note that an MPEG-M value chain is a collection of users, including creators, end users and service providers that conform to the MPEG-M standard.

In many real-world MPEG-M value chains, service providers would not be able to exploit the potential of the standard if they were confined to only offer ESs. Therefore service providers typically offer bundles of ESs, known as Aggregated Services (ASs). In general, as shown in Figure 1, there is a plurality of service providers offering the same or partially overlapping ASs. For example, an SP offering User Description Services may offer Content Description Services as well.

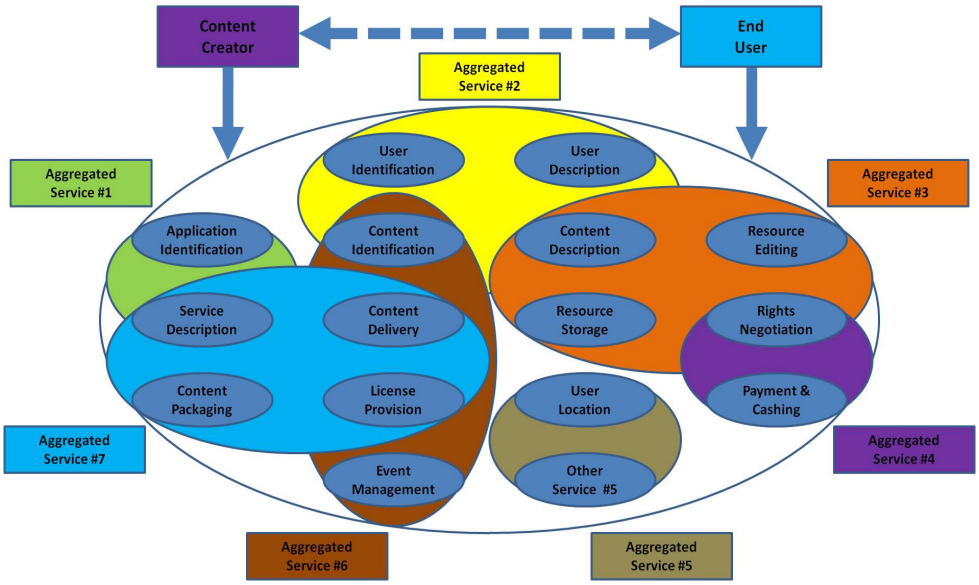

Figure 1 — Typical devices in a media-handling value chain

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Starting from ISO/IEC 23006 elementary services, the aggregation of services can put together a certain amount of services generating a complex ISO/IEC 23006 value network, having different topologies and associating services in several ways. For example, the Payment and Cashing and Rights Negotiation ESs are aggregated to create AS#4, while Content Delivery and License Provision ESs are both shared between AS#6 and AS#7.

Thanks to the ISO/IEC 23006 suite of standards, aimed at facilitating the creation and provisioning of vastly enhanced IPTV services, it is envisaged that a thriving digital media economy can be established, where:

— developers can offer MPEG-M service components to the professional market because a market will be enabled by the standard MPEG-M component service API;

— manufacturers can offer MPEG-M devices to the global consumer market because of the global reach of MPEG-M services;

— service providers can set up and launch new attractive MPEG-M services because of the ease to design and implement innovative MPEG-M value chains;

— users can seamlessly create, offer, search, access, pay/cash and consume MPEG-M services.

The MPEG-M suite of standards extends the devices capabilities with advanced features such as content generation, processing, and distribution by a large number of users; easy creation of new services by combining service components of their choice; global, seamless and transparent use of services regardless of geo-location, service provider, network provider, device manufacturer and provider of payment and cashing services; diversity of user experience through easy download and installation of applications produced by a global community of developers since all applications share the same middleware APIs; and innovative business models because of the ease to design and implement media-handling value chains whose devices interoperate because they are all based on the same set of technologies, especially MPEG technologies.

The ISO/IEC 23006 suite of standards is subdivided into five parts:

Part 1: Architecture (the present document): 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): 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; and

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

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Information technology — Multimedia service platform technologies —

Part 1:
Architecture

1 Scope

This part of ISO/IEC 23006 specifies the MPEG-M architecture that is made accessible through the set of MPEG-M middleware APIs, elementary services and service aggregation specified in ISO/IEC 23006-2, ISO/IEC 23006-4 and ISO/IEC 23006-5 and as a software implementation in ISO/IEC 23006-3, respectively.

The elements of the MPEG-M Architecture are:

1. MPEG-M Engines: collections of specific technologies that are meaningfully bundled together to provide a specific functionality requested by applications;

2. MPEG-M Engine APIs: APIs that can be used by applications to access an MPEG-M Engine functionality;

3. MPEG-M Orchestrator Engine: a special MPEG-M Engine capable of creating chains of MPEG-M Engines to execute a high-level application call such as “Play” that typically requires the activation of multiple engine functionalities;

4. MPEG-M Orchestrator Engine APIs: APIs that can be used to access the MPEG-M Orchestrator Engine;

5. MPEG-M Device: a device equipped with MPEG-M Engines;

6. MPEG-M Application: an application that runs on an MPEG-M Device and makes calls to the MPEG-M Engine and MPEG-M Orchestrator Engine APIs.

The second edition of this part of ISO/IEC 23006 has been developed with a focus on advanced IPTV terminals. It preserves the architecture and design philosophy of the first edition, but stresses the Service Oriented Architecture character.

2 Normative references

The following referenced documents are indispensable for the application 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 23006-2, *Information technology — Multimedia service platform technologies — Part 2: MPEG extensible middleware (MXM) API*

ISO/IEC 23006-3, *Information technology — Multimedia service platform technologies — Part 3: Conformance and reference software*

ISO/IEC 23006-4, *Information technology — Multimedia service platform technologies — Part 4: Elementary services*

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ISO/IEC 23006-5, *Information technology — Multimedia service platform technologies — Part 5: Service aggregation*

OMG BPMN 2.0, Business Process Model and Notation (BPMN) Version 2.0, Object Management Group, January 2011, http://www.omg.org/spec/BPMN/2.0/

3 Terms and definitions

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

3.1
Device
combination of hardware and software or just an instance of software that allows a user to perform actions

3.2
Domain
set of **devices** sharing a set of common properties such as ownership

3.3
Inter-MPEG-M Protocol
protocol that enables communication between MPEG-M Devices

3.4
MPEG-M Application
application that runs on an MPEG-M Device and makes calls to the MPEG-M Application API and MPEG-M Engine APIs

3.5
MPEG-M Device
device equipped with a selected set of MPEG-M engines

3.6
MPEG-M Engine
collection of specific technologies that are bundled together to provide a specific functionality that is needed by MPEG-M Applications

3.7
MPEG-M Engine API
API of a single MPEG-M Engine

3.8
MPEG-M Orchestrator API
API of the MPEG-M Orchestrator Engine

3.9
MPEG-M Orchestrator Engine
special MPEG-M Engine capable of creating chains of MPEG-M engines, i.e. to set-up a sequence of connected MPEG-M engines for the purpose of executing a high-level application call such as Play.

3.10
MPEG-M Technology
technology that is required to implement (a profile of) MPEG-M

3.11
User
any entity making use of an MPEG-M **device**

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4 Symbols and abbreviated terms

BBL	Bitstream Binding Language
BPMN	Business Process Model and Notation
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
IPMP	Intellectual Property Management and Protection
REL	Rights Expression Language
RTP	Real Time Protocol
RTSP	Real Time Streaming Protocol
URI	Uniform Resource Identifier

5 Namespace conventions

Throughout this part of ISO/IEC 23006, Qualified Names are written with a namespace prefix followed by a colon followed by the local part of the Qualified Name.

For clarity, throughout this part of ISO/IEC 23006, consistent namespace prefixes are used. Table 1 gives these prefixes and the corresponding namespace.

Table 1 — Namespaces and prefixes

Prefix	Corresponding namespace
mpegm	urn:mpeg:mpegM:schema:02-service-NS:2011
mpegmb	urn:mpeg:mpegM:schema:01-base-NS:2011
dia	urn:mpeg:mpeg21:2003:01-DIA-NS
erl	urn:mpeg:mpeg21:2005:01-ERL-NS
fru	urn:mpeg:mpegB:schema:FragmentRequestUnits:2007
mpeg7	urn:mpeg:mpeg7:schema:2004
mpeg7s	urn:mpeg:mpeg7:systems:2001
cel	urn:mpeg:mpeg21:cel:contract:2011
bbl	urn:mpeg:mpeg21:2007:01-BBL-NS
dii	urn:mpeg:mpeg21:2002:01-DII-NS
mpqf	urn:mpeg:mpqf:schema:2008
mpeg4ipmp	urn:mpeg:mpeg4:IPMPSchema:2002
ipmpdidl	urn:mpeg:mpeg21:2004:01-IPMPDIDL-NS
ipmpmsg	urn:mpeg:mpeg21:2006:07-IPMPMESSAGES-NS
ipmpinfo	urn:mpeg:mpeg21:2004:01-IPMPINFO-NS

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