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Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 1: MPEG media transport (MMT)

Technologies de l'information — Codage à haute efficacité et livraison des medias dans des environnements hétérogènes —

Partie 1: Transport des médias MPEG

Reference number
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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.

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 third edition cancels and replaces the second edition (ISO/IEC 23008-1:2017), which has been technically revised. It also incorporates the Amendment ISO/IEC 23008-1:2017/Amd 1:2017.

The main changes are as follows:

— addition of signalling message for layout configuration;

— addition of signalling messages related to delivery over mobile networks;

— addition of signalling messages to support multipath delivery;

— addition of procedcure for session setup and control;

— addition of procedcure for using WebSockets.

A list of all parts in the ISO/IEC 23008 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.

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Introduction

This document specifies the MPEG media transport (MMT) technologies for the transport and delivery of coded media data for multimedia services over heterogeneous packet-switched networks including internet protocol (IP) networks and digital broadcasting networks. In this document, "coded media data" includes both timed audiovisual media data and non-timed data.

MMT is designed under the assumption that the coded media data will be delivered over a packet-switched delivery network. Several characteristics of such delivery environment, such as non-constant end-to-end delay of each packet from the sending entity to the receiving entity, have been taken into consideration.

For efficient and effective delivery and consumption of coded media data over packet-switched delivery networks, this document provides the following elements:

— the logical model to construct contents composed of components from various sources, for example, components of mash-up applications;

— the formats to convey information about the coded media data, to enable delivery layer processing, such as packetization;

— the packetization method and the structure of the packet to deliver media content over packet-switched networks supporting media and coding independent hybrid delivery over multiple channels;

— the format of the signalling messages to manage delivery and consumption of media content.

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Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 1: MPEG media transport (MMT)

1 Scope

This document specifies MPEG media transport (MMT) technologies, which include a single encapsulation format, delivery protocols and signalling messages for transport and delivery of multimedia data over heterogeneous packet-switched networks for multimedia services. Types of packet-switched networks supported by this document include bidirectional networks such as Internet Protocol (IP) networks and unidirectional networks such as digital broadcast networks (which may or may not use the IP).

The technologies specified by this document belong to one of three functional areas of MMT: media processing unit (MPU) format, signalling messages and delivery protocol.

The MPU format specifies the "`mpuf`" branded ISO-based media file format (ISOBMFF) encapsulating both timed and non-timed media contents. The MPU format is a self-contained ISOBMFF structure enabling independent consumption of media data, which hides codec-specific details from the delivery function.

The signalling functional area specifies the formats of signalling messages carrying information for managing media content delivery and consumption, e.g. specific media locations and delivery configuration of media contents.

The delivery functional area specifies the payload formats that are independent of media and codec types, which allow fragmentation and aggregation of contents encapsulated as specified by this document for delivery using packet-switched oriented transport protocols. The delivery functional area also provides an application layer transport protocol that allows for advanced delivery of media contents.

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 14496-12:2022, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 23000-19, *Information technology — Multimedia application format (MPEG-A) — Part 19: Common media application format (CMAF) for segmented media*

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax, January 2005*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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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 Electroped ia: available at https://www.electropedia.org/

3.1.1
access unit
AU
smallest media data entity to which timing information can be attributed

3.1.2
asset
any multimedia data entity that is associated with a unique identifier and that is used for building a multimedia presentation

3.1.3
dependent asset
asset (3.1.2) for which one or more other assets are necessary for decoding of the contained media content

3.1.4
encoding symbol
unit of data generated by the encoding process

3.1.5
encoding symbol block
set of *encoding symbols* (3.1.4)

3.1.6
FEC code
algorithm for encoding data such that the encoded data flow is resilient to data loss

3.1.7
FEC encoded flow
logical set of flows that consists of an *FEC source flow* (3.1.11) and one or more associated *FEC repair flows* (3.1.9)

3.1.8
FEC payload ID
identifier that identifies the contents of an *MMTP packet* (3.1.20) with respect to the *MMT FEC scheme* (3.1.16)

3.1.9
FEC repair flow
data flow carrying repair symbols to protect an *FEC source flow* (3.1.11)

3.1.10
FEC repair packet
MMTP packet (3.1.20) along with *repair FEC payload identifier* (3.1.27) to deliver one or more *repair symbols* (3.1.29) of a *repair symbol block* (3.1.30)

3.1.11
FEC source flow
flow of *MMTP packets* (3.1.20) protected by an *MMT FEC scheme* (3.1.16)

3.1.12
FEC source packet
MMTP packet (3.1.20) protected by an FEC encoding

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3.1.13
media fragment unit
MFU
fragment of a *media processing unit* (3.1.14)

3.1.14
media processing unit
MPU
generic container for independently decodable *timed* (3.1.35) or *non-timed data* (3.1.25) that is media codec agnostic

3.1.15
MMT entity
software and/or hardware implementation that is compliant to a profile of MMT

3.1.16
MMT FEC scheme
forward error correction procedure that defines the additional protocol aspects required to use an FEC scheme in MMT

3.1.17
MMT protocol
MMTP
application layer transport protocol for delivering *MMTP payload* (3.1.22) over IP networks

3.1.18
MMT receiving entity
MMT entity (3.1.15) that receives and consumes media data

3.1.19
MMT sending entity
MMT entity (3.1.15) that sends media data to one or more *MMT receiving entities* (3.1.18)

3.1.20
MMTP packet
formatted unit of the media data to be delivered using the *MMT protocol* (3.1.17)

3.1.21
MMTP packet flow
sequence of *MMTP packets* (3.1.20) with same *MMT sending entity* (3.1.19) and *MMT receiving entity* (3.1.18)

3.1.22
MMTP payload
formatted unit of media data to carry *Packages* (3.1.26) and/or signalling messages using either the *MMT protocol* (3.1.17) or an Internet application layer transport protocols (e.g. RTP).

3.1.23
MMTP session
single *MMTP transport flow* (3.1.24) that is used for certain period of time

3.1.24
MMTP transport flow
series of *MMTP packet flow* (3.1.21) delivered to the same destination

3.1.25
non-timed data
media data that do not have inherent timeline for the decoding and/or presenting of its media content

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3.1.26
package
logical collection of media data, delivered using MMT

3.1.27
repair FEC payload ID
FEC payload ID (3.1.8) for repair packets

3.1.28
repair packet block
segmented set of *FEC repair flow* (3.1.9) which can be used to recover lost source packets

3.1.29
repair symbol
encoding symbol that contains redundancy information for error correction

3.1.30
repair symbol block
set of *repair symbols* (3.1.29) which can be used to recover lost *source symbols* (3.1.33)

3.1.31
source FEC payload ID
FEC payload ID (3.1.8) for source packets

3.1.32
source packet block
segmented set of *FEC source flow* (3.1.11) that is to be protected as a single block

3.1.33
source symbol
unit of data to be encoded by an FEC encoding process

3.1.34
source symbol block
set of *source symbols* (3.1.33) generated from a single *source packet block* (3.1.32)

3.1.35
timed data
data that has inherent timeline information for the decoding and/or presentation of its media contents

3.1.36
asset delivery characteristics
ADC
description about required quality of service (QoS) for delivery of *assets* (3.1.2)

Note 1 to entry: ADC is represented by the parameters agnostic to a specific delivery environment.

3.1.37
network abstraction for media
parameter that is used for an interface between media application layer and underlying network layer

3.2 Abbreviated terms

ADC	asset delivery characteristics
AL-FEC	application layer forward error correction
ARQ	automatic repeat request
AU	access unit

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