

Second edition
2017-08

Corrected version
2017-10

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

**Part 13:
MPEG media transport
implementation guidelines**

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

*Partie 13: Lignes directrices de mise en oeuvre du transport des
médias MPEG*



Reference number
ISO/IEC TR 23008-13:2017(E)

© ISO/IEC 2017

Withdrawn



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2017, 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, symbols and abbreviated terms	1
4 Overview	1
4.1 System overview.....	1
4.2 Normative parts.....	2
5 MMT function deployments	3
5.1 General.....	3
5.2 Object reconstruction.....	3
5.2.1 General.....	3
5.2.2 Recovery in MPU mode.....	4
5.2.3 Recovery in GFD mode.....	5
5.3 Default assets.....	6
5.4 Low-delay live streaming.....	6
5.5 Parallel processing in MMT sending and receiving entities.....	9
5.5.1 Processing in MMT sending entity.....	9
5.5.2 Processing in MMT receiving entity.....	11
5.6 MPU streaming for live services.....	13
5.6.1 MPU packetization.....	13
5.6.2 Sending of MPU and signalling message.....	16
5.7 Fast MMT session acquisition.....	17
5.8 Referencing and processing non-timed data.....	18
5.8.1 General.....	18
5.8.2 Resource grouping and referencing.....	19
5.8.3 Receiver handling.....	19
5.9 Media adaptation for quality control in MMTP.....	19
5.9.1 General.....	19
5.9.2 Parameters for media adaptation.....	19
5.9.3 Adaptation operation of MMT entity.....	20
5.10 Hybrid delivery in MMT.....	20
5.10.1 General.....	20
5.10.2 Classification of hybrid delivery.....	20
5.10.3 Technical elements for hybrid delivery.....	21
5.11 Example of detailed implementation of MMT.....	22
5.11.1 Use case: Combination of MMT and MPEG-2 TS for synchronized presentation.....	22
5.11.2 Use case: True real-time video streaming over lossy channel.....	22
5.12 HRBM signalling for hybrid delivery.....	23
5.12.1 Hybrid delivery from the single MMT sending entity.....	23
5.12.2 Hybrid delivery from the multiple MMT sending entities.....	25
5.13 Error resilience in MMT protocol.....	27
5.14 Delay-constrained ARQ.....	28
5.14.1 General.....	28
5.14.2 Delivery-time constrained ARQ.....	28
5.14.3 Arrival-deadline constrained ARQ.....	29
5.15 Application layer forward error correction (AL-FEC).....	31
5.15.1 FEC decoding method for <code>ssbg_mode2</code>	31
5.15.2 Usage of two-stage FEC coding structure.....	35
5.15.3 MPU mapping to source packet block.....	37
5.15.4 FEC for hybrid service.....	38
5.16 Delivery of encrypted MPUs.....	40

5.17	HRBM message updating.....	41
5.17.1	General.....	41
5.17.2	HRBM message sending schedule.....	41
5.17.3	Use case.....	42
5.18	MMTP packet with padded data.....	42
6	Use cases for MMT deployment.....	44
6.1	General.....	44
6.2	Delivery of DASH Presentations using MMT.....	44
6.2.1	General.....	44
6.2.2	Delivery of the MPD.....	44
6.2.3	Delivery of the data segments.....	44
6.3	Client operation for DASH service delivered through MMT Protocol.....	45
6.3.1	Delivery of MPD with MMTP.....	45
6.3.2	Delivery and consumption of DASH Segments with MMTP.....	45
6.4	Hybrid of MMT and DASH over heterogeneous network.....	47
6.5	MMT caching for effective bandwidth utilization.....	49
6.5.1	Overview of MMT caching middlebox architecture.....	49
6.5.2	Content-based caching of MMT media.....	49
6.5.3	MPU sync protocol between server and caching middlebox.....	52
6.5.4	MMT cache manifest.....	56
6.6	Usage of ADC signalling message.....	58
6.6.1	General.....	58
6.6.2	Operation in MMT sending entity.....	58
6.6.3	Operation in MANE router.....	58
6.6.4	Example operation in MMT receiving entities.....	58
6.6.5	QoE multiplexing gain and bottleneck coordination.....	58
6.7	MMT deployment in Japanese broadcasting systems.....	62
6.7.1	General.....	62
6.7.2	Broadcasting systems using MMT.....	62
6.7.3	Media transport protocol.....	64
6.7.4	Signalling information.....	69
6.7.5	Start-up procedure of broadcasting service.....	78
6.8	Conversion of MMTP stream to MPEG-2 TS.....	80
6.8.1	Overview of conversion operation.....	80
6.8.2	Restrictions to MMTP packets.....	80
6.8.3	Calculation of PTS, DTS.....	80
6.8.4	Restriction related to MPEG-2 T-STD.....	81
6.8.5	Packet field conversion rule.....	81
6.8.6	PSI conversion rules.....	82
6.9	MMT service provisioning at conventional broadcast environment.....	84
6.10	Usage of multimedia configuration for interface switching management.....	86
	Bibliography.....	87

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 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC 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 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by 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/TR 23008-13:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

- areas on MMT deployment case in Japan and conversion between MMTP and MPEG-2 TS stream have been improved by adding new guidelines.

A list of all parts in the ISO/IEC 23008 series can be found on the ISO website.

This corrected version of ISO/IEC TR 23008-13:2017 incorporates the following corrections:

- headers have been corrected and now read “ISO/IEC TR” instead of “ISO/TR”.

Introduction

This document provides guidelines for implementation and deployment of multimedia systems based on the ISO/IEC 23008 series. These guidelines include the following:

- guidelines on usage of MMT functions;
- guidelines on deployment use cases designed based on ISO/IEC 23008-1.

Withdrawn

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

Part 13: MPEG media transport implementation guidelines

1 Scope

This document provides technical guidelines for implementing and deploying systems based on ISO/IEC 23008-1.

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 23008-1:2014, *Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 1: MPEG media transport (MMT)*