

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Consumer terminal function for access to IPTV and open internet multimedia services –**

**Part 2-2: HTTP adaptive streaming**

**Fonction des terminaux grand public pour l'accès aux services IPTV et multimédias de l'internet ouvert –**

**Partie 2-2: Diffusion en flux adaptatif sur HTTP**



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2016 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

#### **About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

#### **About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### **IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### **IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### **IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### **Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### **IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### **IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

---

#### **A propos de l'IEC**

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

#### **A propos des publications IEC**

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### **Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### **Recherche de publications IEC - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### **IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### **Electropedia - [www.electropedia.org](http://www.electropedia.org)**

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### **Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### **Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



---

**Consumer terminal function for access to IPTV and open internet multimedia services –**

**Part 2-2: HTTP adaptive streaming**

**Fonction des terminaux grand public pour l'accès aux services IPTV et multimédias de l'internet ouvert –**

**Partie 2-2: Diffusion en flux adaptatif sur HTTP**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 33.170; 35.240.95

ISBN 978-2-8322-3689-5

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions and abbreviated terms .....	8
3.1 General.....	8
3.2 Terms and definitions.....	8
3.3 Abbreviated terms.....	9
4 Adaptive streaming in the OIPF IPTV solution .....	10
5 MPEG DASH based adaptive streaming .....	11
5.1 General.....	11
5.2 DASH usage for the TS systems layer format.....	12
5.2.1 General .....	12
5.2.2 PID allocation .....	12
5.2.3 Protected TS content .....	12
5.3 DASH usage for the MP4 systems layer format .....	13
5.3.1 General .....	13
5.3.2 Protected content .....	13
5.4 Operational parameters .....	14
5.5 Adaptation set audio/video source coding .....	14
5.6 MPD requirements, audio description.....	15
5.7 Key management of protected contents .....	15
6 OIPF HTTP adaptive streaming .....	15
6.1 General.....	15
6.2 Media presentation .....	16
6.2.1 Media presentation description .....	16
6.2.2 Component element.....	16
6.3 Segmentation constraints.....	18
6.4 Signalling of content protection in the MPD.....	20
6.5 Media presentation description updates .....	20
6.6 Adaptive media formats .....	20
6.6.1 General .....	20
6.6.2 MPEG-2 transport stream systems layer.....	20
6.6.3 MP4 file format systems layer.....	22
6.7 Use cases.....	23
6.7.1 Live streaming.....	23
6.7.2 Trick play.....	23
6.7.3 MPEG-2 TS seeking .....	24
Annex A (normative) OIPF HAS MPD schema.....	25
Annex B (informative) OIPF HAS component management .....	26
Annex C (informative) Usage of the MP4 file format in OIPF HAS .....	28
C.1 Audio/video synchronization.....	28
C.2 Partial representations .....	29
Annex D (informative) DASH usage with embedded CSPG .....	31
Bibliography.....	32

Figure 1 – Content segmentation for HTTP adaptive streaming.....	10
Figure 2 – Example of the HAS MPD .....	18
Figure A.1 – HAS MPD schema .....	25
Figure B.1 – Component management example .....	26
Figure C.1 – Example <i>tfad</i> -box.....	29
Figure C.2 – Partial representation MP4 example .....	30
Figure C.3 – Partial representation retrieval.....	30
Table 1 – Role and accessibility descriptor values for audio description.....	15
Table 2 – Component element and attributes .....	17
Table C.1 – Example audio/video synchronization .....	28

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONSUMER TERMINAL FUNCTION FOR ACCESS TO IPTV  
AND OPEN INTERNET MULTIMEDIA SERVICES –****Part 2-2: HTTP adaptive streaming**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62766-2-2 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

CDV	Report on voting
100/2488/CDV	100/2658/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This International Standard is to be used in conjunction with IEC 62766-1.

A list of all parts in the IEC 62766 series, published under the general title *Consumer terminal function for access to IPTV and open internet multimedia services*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## INTRODUCTION

The IEC 62766 series is based on a series of specifications that was originally developed by the OPEN IPTV FORUM (OIPF). They specify the user-to-network interface (UNI) for consumer terminals to access IPTV and open internet multimedia services over managed or non-managed networks as defined by OIPF.

# CONSUMER TERMINAL FUNCTION FOR ACCESS TO IPTV AND OPEN INTERNET MULTIMEDIA SERVICES –

## Part 2-2: HTTP adaptive streaming

### 1 Scope

This part of IEC 62766 specifies media formats for adaptive unicast content streaming over HTTP.

Two HTTP adaptive streaming formats are specified. The first is based entirely on MPEG DASH. The second is the OIPF “HTTP adaptive streaming” (HAS) format, which is based upon 3GPP’s release 9 adaptive HTTP streaming (AHS) format, with some profiling and extensions to add the features of media components and support for MPEG-2 transport stream content segment format. The latter format was specified before MPEG DASH had been published. It is retained due to usage in some legacy applications.

### 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.

IEC 62766-1<sup>1</sup>, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 1: General*

IEC 62766-2-1, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 2-1: Media formats*

IEC 62766-3, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 3: Content metadata*

IEC 62766-4-1<sup>2</sup>, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 4-1: Protocols*

IEC 62766-5-1<sup>3</sup>, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 5-1: Declarative application environment*

IEC 62766-6<sup>4</sup>, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 6: Procedural application environment*

IEC 62766-7<sup>5</sup>, *Consumer terminal function for access to IPTV and open Internet multimedia services – Part 7: Authentication, content protection and service protection*

---

<sup>1</sup> Under preparation. Stage at the time of publication: IEC/CDV 62766-1:2015

<sup>2</sup> Under preparation. Stage at the time of publication: IEC/CDV 62766-4-1:2015

<sup>3</sup> Under preparation. Stage at the time of publication: IEC/CDV 62766-5-1:2015

<sup>4</sup> Under preparation. Stage at the time of publication: IEC/CDV 62766-6:2015

<sup>5</sup> Under preparation. Stage at the time of publication: IEC/CDV 62766-7:2015