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Digital living network alliance (DLNA) home networked device interoperability guidelines –
Part 9: HTTP Adaptive Delivery

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DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 9: HTTP Adaptive Delivery

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International Standard IEC 62481-9 has been prepared under technical area 8: Multimedia home systems and applications for end-user network, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2748/CDV	100/2891/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.

A list of all parts of IEC 62481 series, published under the general title *Digital Living Network Alliance (DLNA) home networked device interoperability guidelines,* 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

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INTRODUCTION

Consumers are acquiring, viewing, and managing an increasing amount of digital media (photos, music, and video) on devices in the consumer electronics (CE), mobile, and personal computer (PC) domains. As such, they want to conveniently enjoy the content, regardless of the source, across different devices and locations in the home. The digital home vision integrates the internet, mobile, and broadcast networks through a seamless, interoperable network, which will provide a unique opportunity for manufacturers and consumers alike. In order to deliver on this vision, a common set of industry design guidelines is needed that allows vendors to participate in a growing marketplace, leading to more innovation, simplicity, and value for consumers. This document serves that purpose and provides vendors with the information needed to build interoperable networked platforms and devices for the digital home.

DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 9: HTTP Adaptive Delivery

1   Scope

This part of IEC 62481 specifies guidelines for the DLNA Adaptive Delivery using HTTP protocol.

The DLNA interoperability guidelines for Adaptive Delivery are based on ISO/IEC 23009-1:2014 standard and enables content authors to describe content in timed segments at various bit rates and media formats. Client rendering devices can select the appropriate timed segments (e.g. bit rate) based on network congestion to maintain smooth streaming of content for display.

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 62481-1-1:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1-1: Architecture and protocols*

IEC 62481-2:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 2: Media format profiles*

IEC 62481-6-1:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 6-1: Remote user interface – HTML5*

ISO/IEC 23009-1:2014, *Informational technology – Dynamic adaptive streaming over HTTP (DASH) – Part 1: Media presentation description and segment formats*

IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*, R. Fielding, UC Irvine, J. Gettys, Compaq/W3C, J. Mogul, Compaq, H. Frystyk, W3C/MIT, L. Masinter, Xerox, P. Leach, Microsoft, T. Berners-Lee
http://www.ietf.org/rfc/rfc2616.txt

3   Terms, definitions, abbreviated terms and conventions

For the purposes of this document, the terms, definitions and abbreviated terms given in IEC 62481-1-1:2017, IEC 62481-2:2017, ISO/IEC 23009-1:2014 and the following 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 Definitions

3.1.1
Adaptive Content
multimedia content encoded into multiple streams using different parameters (i.e. different bitrate) for the purpose of dynamic switching between different streams during a media delivery session

3.2 Abbreviated terms

HTTP-AD   HTTP Adaptive Delivery

MPEG DASH MPEG Dynamic Adaptive Streaming over HTTP

MPD   Media Presentation Description

XDMR   Extended Digital Media Renderer

3.3 Convention

In IEC 62481-1-1:2017 and this document, a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest lowercase (e.g., Adaptive Content). Any lowercase uses of these words have the normal technical English meanings.

4 Networking architecture and guideline conventions

4.1 DLNA home networking architecture

This specification extends the DLNA home networking architecture that is defined in Clause 4 of IEC 62481-1-1:2017.

4.2 HTTP Adaptive Delivery

HTTP Adaptive Delivery Device Option provides guidelines for the dynamic and adaptive HTTP streaming of multimedia content.

HTTP Adaptive Delivery can include sources of content both within the home network and from the internet. The content MPD is intended to be discoverable and deliverable from any device that acts as a content source and exposes content using the DIDL-Lite framework.

4.3 Document conventions

See Clause 6 of IEC 62481-1-1:2017 for a description of the DLNA document conventions.

4.4 Guideline structure

See 7.1 of IEC 62481-1-1:2017 for guideline and attribute table layout descriptions.

5 DLNA device model

5.1 General

Refer to Clause 5 of IEC 62481-1-1:2017, for detailed descriptions of existing DLNA home networking architecture device model. This specification extends the existing DLNA system usages.

5.2   Device capabilities and roles

HTTP Adaptive Delivery Device Option specified in these guidelines provides extensibility for DLNA HTTP streaming to deliver adaptive and dynamic multimedia content by dynamically requesting different representations of the same content item from a server.

On the Serving Endpoint side, the HTTP Adaptive Delivery Device Option has the role of exposing and sourcing the content using the Adaptive Delivery mode, including both the MPD and the media itself (segments for different representations). This functionality maps to the MPD delivery function and segment delivery function in MPEG-DASH.

On the client side, the HTTP Adaptive Delivery Device Option has the role of requesting appropriate content MPD and media representation (segments), assembling, and rendering the media.

5.3   System usages

5.3.1   General

The HTTP Adaptive Delivery enhances the following standard DLNA media delivery system usages with the Adaptive Delivery Device Option, with or without the DLNA Link Protection:

– 2-box Pull system usage as described in 5.3.2;
– 2-box Push system usage as described 5.3.3;
– 3-box system usage as described in 5.3.4;
– 2-box and 3-box RUI with AV system usage as described in 5.3.5;
– Adaptive Internet Resource Media delivery from outside of the DLNA Network as described in 5.3.6.

5.3.2   2-box Pull system usage

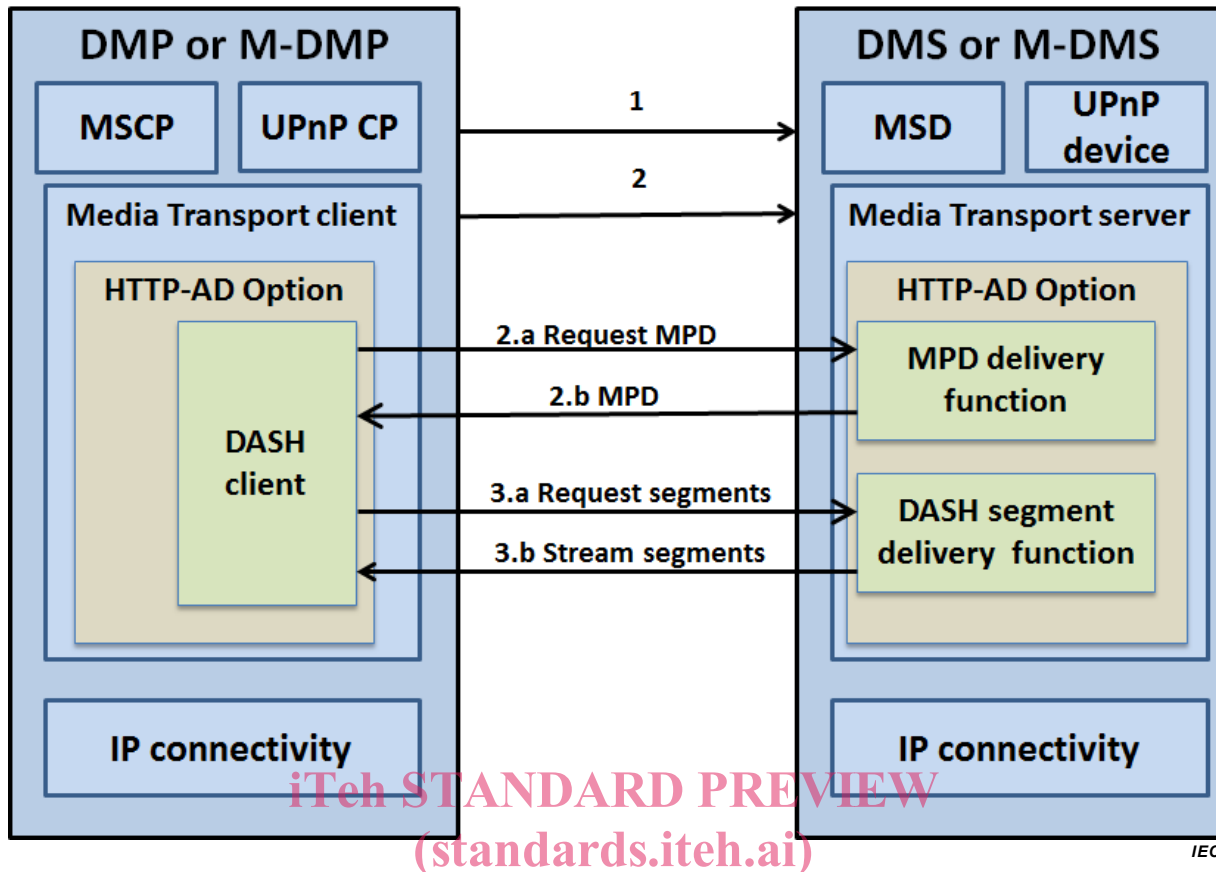Figure 1 illustrates the 2-box Pull system usage for HTTP Adaptive Delivery.

**Figure 1 – 2-box Pull system usage with
HTTP Adaptive Delivery**

Steps:

1. Invoke UPnP actions to set up a playback session.
2. Request content for playback:
   a) request MPD;
   b) obtain MPD.
3. Transport the content to the DMP:
   a) request media segment(s);
   b) stream media.

5.3.3   2-box Push system usage

Figure 2 illustrates the 2-box Push system usage for HTTP Adaptive Delivery.