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Information technology — Dynamic adaptive streaming over HTTP (DASH) —

Part 5: Server and network assisted DASH (SAND)

Technologies de l'information — Diffusion en flux adaptatif dynamique sur HTTP (DASH) —

Partie 5: DASH assisté par serveur et réseau (SAND)



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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. 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).

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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.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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Introduction

In order to enhance the delivery of DASH content, this document introduces messages between DASH clients and network elements or between various network elements for the purpose of improving the efficiency of streaming sessions by providing information about real-time operational characteristics of networks, servers, proxies, caches, CDNs, as well as DASH client's performance and status.

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Information technology — Dynamic adaptive streaming over HTTP (DASH) —

Part 5:
Server and network assisted DASH (SAND)

1 Scope

This document defines the following:

— the functional SAND architecture which identifies the SAND network elements and the nature of SAND messages exchanged among them;

— the semantics of SAND messages exchanged between the network elements present in the SAND architecture;

— an encoding scheme for the SAND messages;

— the SAND message delivery protocol.

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 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

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

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

IETF RFC 6455, *The WebSocket Protocol*

IETF RFC 7233:2014, *Hypertext Transfer Protocol (HTTP/1.1): Range Requests*

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 23009-1 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

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3.1.1
DASH Aware Network Element
DANE
network element which has at least minimum intelligence about DASH; for instance, it may be aware that the delivered objects are DASH-formatted objects such as the MPD or DASH segments, and may prioritize, parse or even modify such objects

3.1.2
SAND messages
messages exchanged between DASH clients, DASH aware Network Elements or Metrics Server in order to either enhance reception (PER) or delivery (PED) of DASH service, or to report status or metrics from the DASH client to DASH aware Network Elements or Metrics Server

3.2 Abbreviated terms

DANE	DASH aware network element
DASH	Dynamic Adaptive Streaming over HTTP
DM	DASH Metrics
HTTP	Hypertext Transfer Protocol
MPD	Media Presentation Description
PED	parameters enhancing delivery
PER	parameters enhancing reception
RNE	regular network element
SAND	server and network assisted DASH
TLS	transport layer security
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
UTC	Coordinated Universal Time
UTF	unicode transformation format
UUID	universally unique identifier
XML	Extensible Mark-Up Language

3.3 Conventions

The following naming conventions apply in this document.

— Elements in an XML document are identified by an upper-case first letter and in bold face as **`Element`**. To express that an element **`Element1`** is contained in another element **`Element2`**, we may write **`Element2.Element1`**. If an element's name consists of two or more combined words, camel-casing is typically used, e.g. **`ImportantElement`**. Elements may be present either exactly once, or the minimum and maximum occurrence is defined by <minOccurs> ... <maxOccurs>.

— Attributes in an XML document are identified by a lower-case first letter, as well as they are preceded by a '@'-sign, e.g. `@attribute`. To point to a specific attribute `@attribute` contained

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