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Part 16: Publish/Subscribe Application Format

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Partie 16: Format des applications Publier/Souscrire

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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 ISO documents 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.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

A list of all parts in the ISO/IEC 23000 series can be found on the ISO website.

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Introduction

ISO/IEC 23000 (also known as “MPEG-A”) is a suite of MPEG standards designed to support a fast track to standardization of tested and verified technologies taken from the MPEG body of standards combined to form Multimedia Application Formats (MAF). If a needed piece of technology is not available within MPEG to achieve the desired format functionality, then additional technologies originating from other organizations may be included by reference.

The MAF defined by the Publish/Subscribe Application Format (PSAF) allows parties of the Publish/Subscribe (PubSub) communication model to support functionalities that are specific to publication, search and consumption of media content (in the following called Resource). The PubSub communication parties are:

a) *Publishers*:

   1) create and store Resource Information (RI) on a publicly accessible location (e.g. an Information Centric Network);

   2) create and send Publications Information (PI) to Match Service Providers (MSP);

b) *Subscribers*:

   1) create and send Subscriptions Information (SI) to Match Service Providers (MSP);

c) *Match Service Providers* (MSP):

   1) perform matches of Subscriptions with Publications;

   2) send Notification Information (NI) to users listed in PIs and SIs when a Match has been found;

d) *Consumers*:

   1) receive Notification Information (NI);

   2) access the Resource present in or referenced by the Resource Information (RI).

NOTE In PubSub, senders do not communicate information directly to the intended receivers but rely on a service that mediates the sender-receiver relationship and sends notifications to relevant parties.

It should be noted that in PSAF, "Publisher" is not necessarily a user who distributes media to end users and "Subscriber" is not necessarily synonymous with end user or consumer. Indeed, in PSAF, Publisher may represent a user who has created a media item and wants to offer it to publishers and Subscriber may represent a publisher who is looking for media to be published and distributed.

PSAF specifies four formats — RI, PI, SI, and NI — to allow Publishers, Subscribers, Match Service Providers and Consumers to manage and control the way the information they exchange is used while trying to achieve their purposes.

The structure of the document is as follows:

Clause 2 lists normative references. Clauses 3 and 4 define the abbreviated terms and the terms used in this document. Clause 5 specifies the PSAF reference model. Clause 6 specifies the DIDL profile schema specific for PSAF and the PSAF Metadata Schema.

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Information technology — Multimedia application format (MPEG-A) —

Part 16: Publish/Subscribe Application Format

1 Scope

This document specifies four formats that are used by parties communicating using the Publish/Subscribe (PubSub) communication model for their multimedia communication purposes.

The PubSub parties are: Publisher, Subscriber, Match Service Provider (MSP) and Consumer and the formats employed are Resource Information (RI), Publication Information (PI), Subscription Information (SI) and Notification Information (NI).

This document specifies RI, PI, SI and NI in such a way that typical multimedia communication requirements can be supported. The following is a non-exhaustive list of such requirements.

— The Publisher can
  — describe the Resource for consumption purposes,
  — define the contract that will bind the Publisher and a Consumer,
  — request a device to report use of the Resource,
  — describe the Resource for distribution purposes,
  — define the contract that will bind the Publisher and a Match Service Provider (MSP) of a match involving the Publication, and
  — request the MSP to notify/not to notify a list of users.
— The Subscriber can
  — query the Resource,
  — define the contract that will bind the Subscriber and a Match Service Provider (MSP), and
  — request the MSP to notify/not to notify a list of users of a match involving the Subscription.

This document does not specify the protocols used to carry these payloads.

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 15938-3, *Information technology — Multimedia content description interface — Part 3: Visual*

ISO/IEC 15938-4, *Information technology — Multimedia content description interface — Part 4: Audio*

ISO/IEC 15938-5, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

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ISO/IEC 15938-12, *Information technology — Multimedia content description interface — Part 12: Query format*

ISO/IEC 21000-2, *Information technology — Multimedia framework (MPEG-21) — Part 2: Digital Item Declaration*

ISO/IEC 21000-3, *Information technology — Multimedia framework (MPEG-21) — Part 3: Digital Item Identification*

ISO/IEC 21000-15, *Information technology — Multimedia framework (MPEG-21) — Part 15: Event Reporting*

ISO/IEC 21000-20, *Information technology — Multimedia framework (MPEG-21) — Part 20: Contract Expression Language*

ISO/IEC 21000-21, *Information technology — Multimedia framework (MPEG-21) — Part 21: Media contract ontology*

ISO/IEC 21000-22, *Information technology — Multimedia framework (MPEG-21) — Part 22: User Description*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 ISO/IEC 21000 series terminology

NOTE The terminology in this document is consistent with that in the ISO/IEC 21000 series, in particular with ISO/IEC 21000-2, ISO/IEC 21000-3, ISO/IEC 21000-15, ISO/IEC 21000-20 and ISO/IEC 21000-22. For readers not familiar with MPEG-21 terminology, the following definitions that are needed for PSAF are provided.

3.1.1
digital item identification
DII
standard (ISO/IEC 21000-3) used by MPEG-21 for identification of digital *item* (3.1.4) and their *components* (3.1.5)

3.1.2
resource
individually identifiable asset such as a video or audio or audio-visual clip, an image, or a text

Note 1 to entry: All resources shall be locatable via a name or an address that is unambiguous in the context where the PubSub communication is performed.

3.1.3
container
structure that allows *items* (3.1.4) and/or containers to be grouped

Note 1 to entry: A container itself is not an item; containers are groupings of items and/or containers. *Descriptors* (3.1.6) allow for the "labelling" of containers with information appropriate for the purpose of the grouping.

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3.1.4
item
grouping of sub-items and/or *components* (3.1.5) that are bound to relevant *descriptors* (3.1.6)

Note 1 to entry: These descriptors contain information about the item. Items may contain choices, which allow them to be customized or configured. Items may be conditional (on predicates asserted by selections defined in the choices).

Note 2 to entry: An item that contains no sub-items can be considered a whole. An item that does contain sub-items can be considered a compilation. Items may also contain annotations to their sub-parts.

3.1.5
component
binding of a *resource* (3.1.2) to a set of *descriptors* (3.1.6)

Note 1 to entry: These descriptors are information concerning all or part of the specific resource instance. A component itself is not an *item* (3.1.4); components are building blocks of items. Components may be conditional (see MPEG-21 DID for details).

3.1.6
descriptor
information associated with the enclosing entity

Note 1 to entry: This information may be a *component* (3.1.5) (such as a thumbnail of an image or a text component) or a textual statement. Descriptors may be conditional (see MPEG-21 DID for details).

3.1.7
event report request
request made to a device to send an *event report* (3.1.8) whenever a certain act is performed at the device

3.1.8
event report
report sent by a device in response to an *event report request* (3.1.7) when the act specified by the ERR occurs

3.1.9
contract
representation of agreements formed for the transaction of MPEG-21 Digital Items or services related to the MPEG-21 Framework

3.1.10
obligation
deontic expression binding one of the parties to execute an Action

3.1.11
permission
deontic expression allowing one of the parties to execute an Action

3.1.12
prohibition
deontic expression binding one of the parties not to execute an Action

3.1.13
user description
description of *user* (3.2.1) conforming to the MPEG-21 User Description standard

3.1.14
context description
standard description of the context in which content is used

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3.1.15
service description
standard description of the service provided by a Service Provider

3.1.16
recommendation description
standard format in which a recommendation is provided

3.2 PSAF user terminology

3.2.1
user
any one of *publisher* (3.2.2), *subscriber* (3.2.3), *match service provider* (3.2.4) and *consumer* (3.2.5)

3.2.2
publisher
user (3.2.1) who creates and sends Publications to a *match service provider* (3.2.4)

3.2.3
subscriber
user (3.2.1) who creates and sends Subscriptions to a *match service provider* (3.2.4)

3.2.4
match service provider
MSP
user (3.2.1) who receives, and finds matches between Subscriptions and Publications, and notifies the match

3.2.5
consumer
user (3.2.1) who is notified by MSP of a potentially relevant *resource* (3.1.2)

3.3 PSAF data set terminology

3.3.1
resource information
RI
data set related to the *resource* (3.1.2)

3.3.2
publication information
PI
data set sent to selected MSP(s) in order to provide information on a certain *resource information* (3.3.1)

3.3.3
subscription information
SI
data set sent to selected MSP(s) in order to query about *resource information* (3.3.1) satisfying specified criteria

3.3.4
notification information
NI
data set sent to *users* (3.2.1) specified in PI and SI containing information about the match between PI and SI

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