BS ISO/IEC 23000-15:2016

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Information technology — Multimedia application format (MPEG-A)

Part 15: Multimedia preservation application format

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National foreword

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

Part 15: Multimedia preservation application format

Technologies de l'information — Format pour application multimédia (MPEG-A) —

Partie 15: Format pour application de la conservation des multimédias

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Foreword

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

ISO/IEC 23000 consists of the following parts, under the general title *Information technology — Multimedia application format (MPEG-A)*:

— *Part 1: Purpose for multimedia application formats*

— *Part 2: MPEG music player application format*

— *Part 3: MPEG photo player application format*

— *Part 4: Musical slide show application format*

— *Part 5: Media streaming application format*

— *Part 6: Professional archival application format*

— *Part 7: Open access application format*

— *Part 8: Portable video application format*

— *Part 9: Digital multimedia broadcasting application format*

— *Part 10: Surveillance application format*

— *Part 11: Stereoscopic video application format*

— *Part 12: Interactive music application format*

— *Part 13: Augmented reality application format*

— *Part 15: Multimedia preservation application format*

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— *Part 16: Publish/subscribe application format*

— *Part 18: Media linking application format*

The following part is under preparation:

— *Part 17: Multiple sensorial media application format*

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Introduction

ISO/IEC 23000 (also known as "MPEG-A") is an MPEG standard that supports a fast track to standardization by selecting readily tested and verified tools taken from the MPEG body of standards and combining them to form a MAF (Multimedia Application Format). If a needed piece of technology is not provided within MPEG, then additional technologies originating from other organizations can be included by reference in order to facilitate the envisioned MAF.

The Multimedia Preservation Application Format (MP-AF ISO/IEC 23000-15) defines the Multimedia Preservation Description Information (MPDI). MPDI extends the concept of Preservation Description Information (PDI),[4] providing metadata addressing the specific requirements for preserving multimedia content.[13] MP-AF defines a metadata format that enables users to effectively exchange information (metadata) related to multimedia preservation operations and their outcomes. Typical examples include the description of integrity checking and related results, content migration from one system to another, replication of subparts or entire contents, content quality evaluation and related quality report, relationships between the source and output of any transformation process, etc. At the core of MP-AF is its data model definition provided through UML diagrams and formal descriptions and a normative XML-Schema implementation. The model has been harmonized with MPEG-21 Digital Item Declaration and the schema reuses considerable parts of existing MPEG technologies, most notably MPEG-21 and MPEG-7.

ISO/IEC 23000 also provides the industry with a coherent and consistent approach to manage multimedia preservation metadata supporting a variety of application scenarios, such a digitization, format migration, content restoration, etc. This includes various applications, hardware/software systems and processing methods used in different digital media administrative domains and being independent of technological changes.

ISO/IEC 23000 defines a data model for preservation metadata and its serialization in XML. It thus serves as an interoperable metadata format at the external interfaces of a digital preservation system. The most widely known and adopted reference model for digital preservation is the Open Archival Information System (OAIS),[4] a framework for understanding and applying concepts necessary for long-term preservation of digital information. In the following, the OAIS terminology is adopted for describing the several preservation notions addressed by MP-AF.

OAIS defines information packages (IP) at the ingest (submission – SIP) and delivery (dissemination – DIP) side of a preservation system. These packages enfold the object of digital preservation that is made up of the content items (one or more) and associated resources and metadata. Different packaging formats can serve as an implementation for the IP and the same type of wrapper could be used for submission, dissemination, as well as internal (archive) IPs. According to the OAIS guidelines, the Professional Archival Application Format (ISO/IEC 23000-6:2012, PA-AF), which has been designed to provide a standardized packaging format for digital files, fulfils the needs for a packaging format within MPEG technologies.

The basic objective of digital preservation is to enable the seamless communication of information over time and free from loss or corruption. Traditionally, this has been achieved by the conservation of physical media on which the information is inscribed and materially associated. If the physical object persists without alteration, the information remains unchanged and is being communicated to any person or system capable of receiving it.

Even if some physical change occurs, the essential characteristics of the information it carries may remain intact. For example, the ink in a textual document may have faded, but the text can remain fully readable. However, the persistence of digital information is complicated by several factors, mainly technological change. Obsolescence may make digital storage media unreadable and digital encodings indecipherable. Progress may make it desirable to use new software to process old data, but entails the risk that the output is not faithful to the source. For multimedia, the complexity is increased by the variety of formats used and the complexity introduced by the use of compression, codecs and wrappers.

For any use over time where the integrity of the data or fidelity to original properties are important, controls that are independent of the technologies used to store and process the data need to be imposed.

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The foundation for such controls is Preservation Description Information (PDI[4]). PDI is metadata and contextual information that identifies what is being preserved, defines its essential properties, describes requirements for processing it, and identifies processes which generated, used or modified Digital Items as well as their results.

Many organizations collecting multimedia content, such as archives, libraries, museums, etc. already have digital preservation systems in place. These organizations have sometimes the need to exchange multimedia assets and related metadata, for example

— to exchange assets between preservation systems/repositories within the organization or with related organizations,

— to change/upgrade their preservation systems,

— to exchange content with service providers, and

— to provide preservation services for other organizations.

These exchanges need to include preservation description information that enables the receiving organization both to assess the integrity and fidelity of the assets it receives and to establish a baseline for curation and use of the assets. The description may include metadata about content, structure and quality, as well as technical, historical and editorial information, and information about property and use rights and conditions.

The following are the purposes of the MP-AF in brief:

— to enable the exchange of multimedia assets (multimedia resources plus associated metadata) between different repositories by providing interoperable preservation description information;

— to enable archive management to react to specific events and determine when preservation actions, such as migration, are needed to maintain the accessibility of preserved multimedia content;

— to enable automatic assessment of preservation strategies and their execution;

— to enable archive management to avoid corruption or loss of multimedia assets when changes are made in the hardware, software or storage media used by the archive by providing standardized descriptors to characterize multimedia assets and to describe preservation actions and outcomes for long term preservation;

— to enable producers (originators of assets to be preserved) to provide the archive with sufficient descriptive information to assess, plan for, and carry out preservation processes that maintain the integrity and fidelity of the content;

— to enable consumers who need comprehensive and interoperable preservation description information (e.g. other archives and consumers who wish to use preserved assets in the production of new ones) to receive standard preservation description information together with multimedia assets.

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

Part 15: Multimedia preservation application format

1 Scope

This part of ISO/IEC 23000 specifies the standard representation of the multimedia description information (MPDI) generated and used by an organization in the process of preserving a multimedia asset for the purpose of facilitating the exchange of multimedia content between archives or other stakeholders (e.g. publishers, broadcasters, service providers and the like), as well as subsequent preservation and use.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15938-4:2002/Amd 1, *Audio extensions*

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

ISO/IEC 15938-5:2003/Amd 5, *Quality metadata, multiple text encodings, extended classification metadata*

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

ISO/IEC 21000-3:2003, *Information technology — Multimedia framework (MPEG-21) — Part 3: Digital Item Identification*

ISO/IEC 21000-3:2003/Amd 1, *Related identifier types*

ISO/IEC 21000-3:2003/Amd 2, *Digital item semantic relationships*

ISO/IEC 21000-5, *Information technology — Multimedia framework (MPEG-21) — Part 5: Rights Expression Language*

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 15924, *Information and documentation — Codes for the representation of names of scripts*

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/

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ISO Online browsing platform: available at http://www.iso.org/obp

For the terms used in this document and not defined in this clause, please refer to the normative references.

3.1 MPEG-21 terminology

MP-AF terminology is consistent with the terminology adopted in MPEG-21. As the reader of the MP-AF specification may not be familiar with terminology from ISO/IEC 21000-2 MPEG-21 Digital Item Declaration (DID), the definitions of the following terms needed for the definition of MP-AF are included in 3.1.

3.1.1
Digital Item Identification
DII
standard (ISO/IEC 21000-3) used by MPEG-21 for identification of Digital Item and their components

3.1.2
Resource
individually identifiable asset such as a video or audio clip, an image, or a textual asset

Note 1 to entry: A resource may also potentially be a physical object (e.g. a video tape).

Note 2 to entry: All resources shall be locatable via an unambiguous address.

Note 3 to entry: The term asset in the definition has a different meaning than the MP-AF term Asset defined in 3.2.3.

3.1.3
Container
structure that allows Items 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.

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. 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.

Note 2 to entry: The term Item from MPEG-21 DID is used synonymously with Digital Item in this part of ISO/IEC 23000.

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
associates information 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).

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3.2 MP-AF Structure terminology

3.2 introduces the terms of the relevant entities in the MP-AF data model. While 3.2 provides definitions of the terms, the entities of the model are described in 5.2 (including visualization in Figure 1).

3.2.1
Work
creation that retains intellectual or descriptive attributes independently of its manifestations

Note 1 to entry: This concept is also referred to as creation or intellectual entity in other contexts.

3.2.2
Preservation Object
combines information describing the intellectual and artistic attributes of a *Work* (3.2.1) together with Digital *Items* (3.1.4) that encode the Work

Note 1 to entry: It includes technical, descriptive and preservation metadata and any other information needed to ensure consistent and reliable access to the Digital Item(s) over time. A Preservation Object may contain Digital Items pertaining to one or more particular *Representation(s)* (3.2.5) together with information and metadata specific to that Representation. It may also contain metadata common to all Representations. A Preservation Object may contain other Preservation Objects.

3.2.3
Asset
special type of *Preservation Object* (3.2.2) describing a *Work* (3.2.1) and the associated exploitation rights belonging to a known owner

Note 1 to entry: The entity holding the rights on the digital copies may be different from the one holding the rights on the Work itself.

3.2.4
Group
logical aggregation of related Preservation Objects

Note 1 to entry: It may represent a physical or virtual collection, a bunch of *Items* (3.1.4), a shipment, etc.

Note 2 to entry: The data model supports Preservation Objects to be composed of other Preservation Objects. A Group is an aggregation of Preservation Objects, but is not a Preservation Object itself.

3.2.5
Representation
specific and complete manifestation of the *Work* (3.2.1)

Note 1 to entry: Representations may differ in terms of technical or descriptive properties while sharing the same intellectual and/or descriptive attributes of the Work (e.g. different performances of the same Work, low vs. high definition representations of a movie).

Note 2 to entry: A Representation aggregates the whole set of *Essences* (3.2.6) plus any additional metadata needed for a complete presentation of a Work.

3.2.6
Essence
manifestation of a *Work* (3.2.1) or part of a Work; refers to the metadata needed for correctly rendering media content including all associated *Components* (3.2.7)

3.2.7
Component
entity holding specific technical metadata supporting the handling of the media resource referenced by a *Media Locator* (3.2.10)

Note 1 to entry: A Component can be a File or *Bitstream* (3.2.9). It manages a (virtual/internal) file structure, multimedia resources and (optionally) referenced metadata (e.g. controlled vocabularies, taxonomies, original content or metadata files).

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3.2.8
File
Component (3.2.7) materialized as a unit recognized by a computer system, subsystem, or application

3.2.9
Bitstream
Component (3.2.7) recorded as contiguous or non-contiguous data within a File

Note 1 to entry: If metadata are specific to streams or tracks (e.g. audio and video tracks of a file), Bitstream shall be used and descriptors shall be added on Bitstream level.

3.2.10
Media Locator
reference or identifier of a storage media volume, Item or part of an Item containing at least one *Component* (3.2.7)

3.3 MP-AF Description terminology

3.3.1
Common Core Metadata Set
contains basic technical and descriptive attributes, which can be easily mapped to different metadata formats in use (also outside the preservation domain)

3.3.2
Core Descriptive Metadata
basic set of editorial properties describing the Digital Item

EXAMPLE Title or subject.

3.3.3
Core Technical metadata
basic set of technical properties of the Digital Item or Component

EXAMPLE Video resolution or audio sampling rate.

3.3.4
Media
"multimedia" such as audio, video, medical imagery and the like

Note 1 to entry: When referring to the units of physical materials on which digital data are recorded, the terms "storage media" or "physical media" are used.

3.4 Multimedia Preservation Description Information (MPDI) terminology

The preservation description information (PDI) applies to multimedia assets being preserved. MPDI adapts and extends the concept of preservation description information from OAIS in order to better address the long term accessibility of multimedia assets. MPDI consists of metadata for Provenance, Context, Reference, Quality, Fixity, Integrity, Authenticity, and Rights. The requirements for MPDI are detailed in Reference [13].

3.4.1
Provenance
documents the chronology of events regarding the creation, modification, ownership and custody of a resource, such as who produced it and who has had custody since its origination; it provides information on the history of the multimedia content (including processing history).

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3.4.2
Context
circumstances that resulted in the production of the resource and how the preserved resource relates to other resources

EXAMPLE It may describe why and how the resource was created, it may indicate from which resources the current one has been derived, or it may specify the relationship to other resources.

3.4.3
Reference
information that is used for identifying the multimedia resources

Note 1 to entry: It provides one or more identifiers, or systems of identifiers, by which the resources may be uniquely and persistently identified. Reference information supports the linkage of identical or related resources that might be stored in separate repositories. These repositories may use different mechanisms for identifying resources (e.g. using different standards for representing local identifiers).

3.4.4
Quality
information related to the description of the technical condition of Digital Items and resources

Note 1 to entry: This information can at least partly be automatically extracted from content with specialized tools but often requires manual revision and validation. This manual work causes considerable costs, which is an additional reason for preserving it. Quality information includes audio and visual defects and characteristics, their collocation in time and space and their severity. Additionally, structural information and technical metadata of resources in relation to relevant standards are considered. This latter kind of information is contained in media container and bitstream metadata rather than in the multimedia content itself. Finally, it is also necessary to preserve the description of the hardware devices, tools and agents used for extracting and reviewing that quality information.

3.4.5
Fixity
encompasses the information ensuring that resources (as described by their properties) are not altered in an undocumented manner

Note 1 to entry: This information is also used to verify the integrity of Digital Items. Thus, if the fixity information for an Item changes over time, the Item has changed.

3.4.6
Integrity
state of a Digital Item indicating the fact of being complete and unaltered

Note 1 to entry: It can be proven by verifying the presence of all required parts in an unaltered (i.e. not modified) state.

3.4.7
Authenticity
information to enable an Agent to verify that an object is correctly identified and free from (intentional or accidental) corruption (i.e. capable of delivering its original message)

Note 1 to entry: The Agents that issue statements about authenticity should also be correctly identified. Authenticity encompasses identity and integrity. Identity comprises all those attributes necessary to determine what a thing is (e.g. the original recording of a Work). Integrity asserts that none of those essential attributes have changed, i.e. there are no significant differences neither in the same resource over time nor between two resources thought to be copies of the same asset. While identical copies are authentic, authenticity does not require complete equivalence. Thus, a digital version of an analog original may be an authentic copy of the Work if it can be shown that the differences between the two versions are not significant, e.g. all of the content is present and is structured the same way, and all important elements or attributes, such as title, creator, performer, remain the same.

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3.4.8
Rights
information concerning legal, regulatory or contractual provisions that affect ownership, control, access or use of resources insofar as they impact the long term preservation

EXAMPLE Intellectual property, copyrights, privacy, etc.

Note 1 to entry: Actions or events in the preservation of resources need to respect such rights.

3.5 MP-AF Process terminology

3.5.1
Activity
preservation action performed on at least one Digital Item or Component

Note 1 to entry: The activity is carried out by one or more *Operators* (3.5.2) known to the preservation system.

3.5.2
Operator
Agent (3.5.3) or a *Tool* (3.5.4) contributing to the execution of an *Activity* (3.5.1) by performing (part of) it or being used to perform it

3.5.3
Agent
person or legal entity (organization) involved in one or more Activities dealing with the processing of Digital Items or Components

3.5.4
Tool
device, system or software used for executing Activities dealing with the processing of Digital Items or Components

4 Abbreviated terms

AVDP	MPEG-7, Audiovisual Description Profile (ISO/IEC 15938-9:2005/Amd 1:2012)
CCDM	EBU, Conceptual Class Description Model
DID	ISO/IEC 21000-2 MPEG-21, Digital Item Declaration
DIDL	ISO/IEC 21000-2 MPEG-21, Digital Item Declaration Language
DII	ISO/IEC 21000-3 MPEG-21, Digital Item Identification
DIP	OAIS, Dissemination Information Package
EIDR	Entertainment Identifier Registry Association
EBU	European Broadcasting Union
ISAN	International Standard Audiovisual Number
MPDI	Multimedia Preservation Description Information
MP-AF	Multimedia Preservation Application Format (subject of this part of ISO/IEC 23000)
MPEG-A	ISO/IEC 23000, Application Formats
OAIS	Open Archival Information System

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PA-AF	MPEG-A, Professional Archival Application Format
PDI	OAIS, Preservation Description Information
PREMIS	Preservation Metadata Maintenance Activity
PRONOM	The National Archives' technical registry (UK)
PUID	PRONOM, Persistent Unique identifier
SIP	OAIS, Submission Information Package
SMPTE	Society of Motion Picture and Television Engineers
UMID	SMPTE 330M, Unique Media Identifier
W3C	World Wide Web Consortium

5 MP-AF data model

5.1 General

The MP-AF data model allows to effectively represent all the relevant metadata for the preservation of digital objects, with specific attention to, but not limited to, multimedia, including images, graphics, video, animation, sound and text, and any combinations of those.

Clause 5 is split into the description of the logical data model (5.2) that makes use of UML diagrams and the description of MPDI descriptors (5.3). XML Schema is used to define the normative serialization of the model.

5.2 Logical data model

5.2 introduces the main entities of the MP-AF logical data model.

The definition of the elements/classes of the MP-AF data model follows the goal of maximizing interoperability and maintaining logical compatibility with existing preservation data models. This should facilitate the adoption of the MP-AF model among organizations that already use compatible models, at least for data exchange purposes, such as the migration between preservation systems (for software or hardware upgrade, for example) or for exchange between repositories.

The MP-AF data model is defined for representing the Multimedia Preservation Description Information (MPDI) needed for discovering, preserving, accessing and delivering multimedia resources. An overview of the logical data model is shown in Figure 1 represented in UML language. It is made up of entities with a <<Metadata>> stereotype, which correspond to the metadata types specified in 5.3.3.

The following subclauses describe the MP-AF Digital Item Entities (5.2.1), the MP-AF Process Entities (5.2.2), their relations to MPEG-21 DID Entities (5.2.3) and the mechanism for defining specializations of Activities and Operators (5.2.4). In each subclause, the involved part of the implementation schema are reported in specific text boxes and explained.

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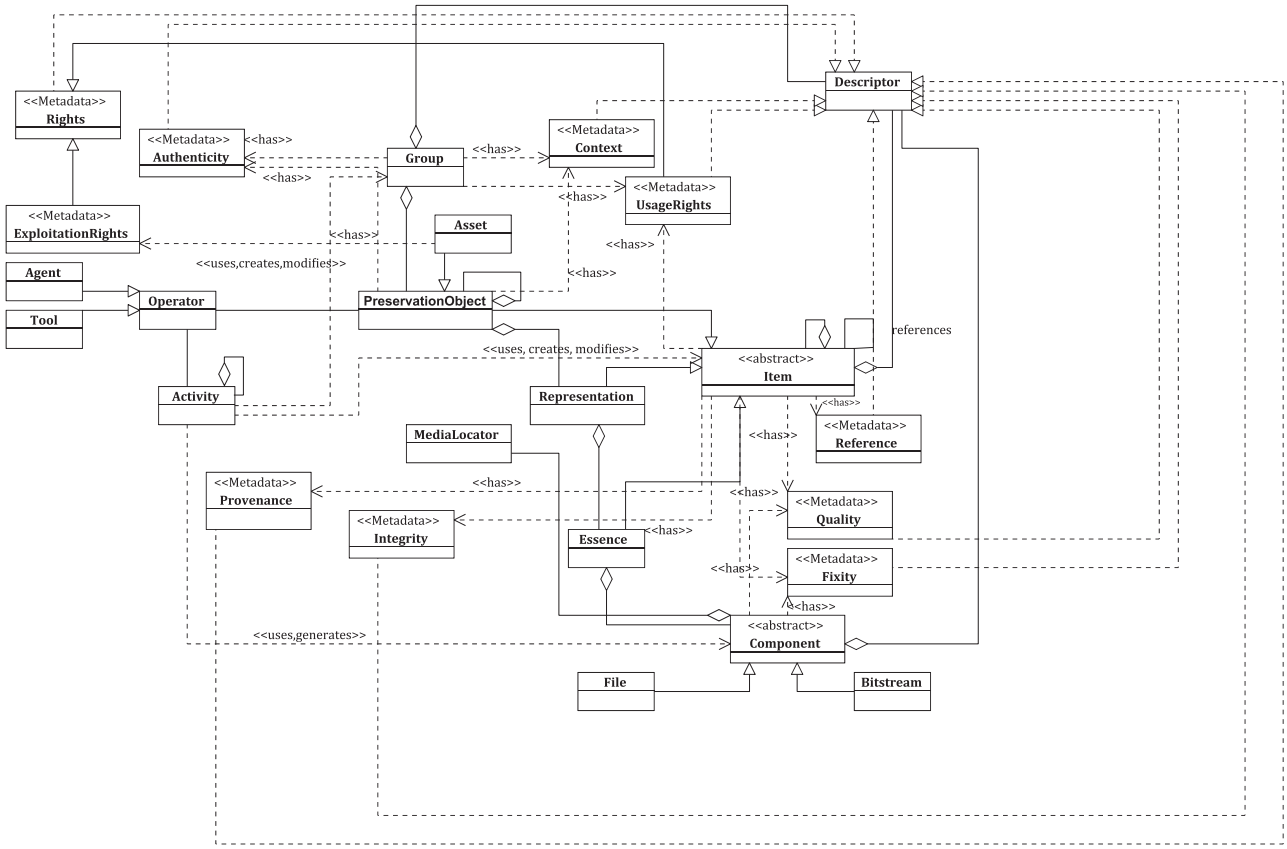

Figure 1 — UML diagram of the MP-AF data model.

5.2.1 MP-AF Digital Item Entities

The central entities in the model are those describing multimedia content. All of them are Digital Items representing the following three levels of aggregation:

— preservation object and asset;

— representation;

— essence.

Some of the entities described in 5.2.1 are based on entities defined in MPEG-21 DID. Their relation to the MPEG-21 DID entities is detailed in 5.2.3.

5.2.1.1 Digital Item

An intellectual/editorial entity to be preserved, a representation of such an entity or an essence. See 4.1.4. This entity is abstract, only its specializations may be instantiated.

5.2.1.1.1 ItemBaseType

Base type for Items described in place or references to Items. This type establishes the inheritance from MPEG-21 DID model ItemType, and serves as a common ancestor for Items described in place or being referenced. This enables Items and references to Items to be treated in the same way, thus supporting splitting the structure definition within a document or over multiple documents in order to simplify parsing the structure.

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```
<complexType name="ItemBaseType" abstract="true">
  <complexContent>
   <extension base="didmodel:ItemType" />
  </complexContent>
</complexType>
```

5.2.1.1.2 ItemType

Base type for Items described in place. It is the common ancestor of all types representing content.

```
<complexType name="ItemType" abstract="true">
  <complexContent>
   <extension base="mpaf:ItemBaseType">
    <attribute name="uri" type="anyURI">
    </attribute>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
uri	URI identifying the Item. URI may be abbreviated as relative URIs, if they have the document URI as base URI.

5.2.1.1.3 ItemRefBaseType

Base type for reference to an Item.

```
<complexType name="ItemRefBaseType" abstract="true">
  <complexContent>
   <extension base="mpaf:ItemBaseType">
    <sequence />
   </extension>
  </complexContent>
</complexType>
```

5.2.1.1.4 ItemRefType

Reference to an Item. Items and references to Items can be treated in the same way, thus supporting splitting the structure definition within a document or over multiple documents in order to simplify parsing the structure.

```
<complexType name="ItemRefType">
  <complexContent>
   <extension base="mpaf:ItemRefBaseType">
    <attribute name="ref" type="anyURI">
    </attribute>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
ref	This shall reference an element in the same preservation metadata document (a relative URL may be used) or an element in another document (using an absolute URL).

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5.2.1.2 Preservation Object

See 4.2.2.

Relations

— Preservation Object aggregates 0..n Preservation Objects: Preservation Objects may be recursively nested in order to express the natural structure of various types of multimedia content. In this particular case, it can be treated also as a single object (e.g. an entire audio CD vs. the tracks it contains).

— Preservation Object aggregates 0..n Representations

5.2.1.2.1 PreservationObjectType

A Preservation Object.

```
<complexType name="PreservationObjectType">
  <complexContent>
   <extension base="mpaf:ItemType">
    <sequence>
     <element name="Condition" type="didmodel:ConditionType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Choice" type="didmodel:ChoiceType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Item" type="mpaf:ItemType" minOccurs="0" maxOccurs="unbounded">
     </element>
    </sequence>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
`Condition`	Condition as defined by MPEG-21 DID.
`Descriptor`	The Descriptor(s) of the PreservationObject. See 5.2.1.11 for permitted descriptor types.
`Choice`	Choice as defined by MPEG-21 DID.
`Item`	Item may be of type PreservationObject or Representation only.

5.2.1.3 Asset

Asset is a specialization of Preservation Object, characterized by a mandatory descriptor for ExploitationRights (cf. SMPTE definition of Asset). A PreservationObject having ExploitationRights has to be represented as an Asset. See 4.2.3.

Relations

— Asset has 1..n ExploitationRights descriptors.

5.2.1.3.1 AssetType

A Preservation Object with associated exploitation rights.

```
<complexType name="AssetType">
  <complexContent>
   <restriction base="mpaf:PreservationObjectType">
    <sequence>
     <element name="Condition" type="didmodel:ConditionType" minOccurs="0"
maxOccurs="unbounded">
     </element>
```


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```
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="1"
maxOccurs="unbounded">
     </element>
     <element name="Choice" type="didmodel:ChoiceType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Item" type="mpaf:ItemType" minOccurs="0" maxOccurs="unbounded">
     </element>
    </sequence>
    <attribute name="uri" type="anyURI">
    </attribute>
   </restriction>
  </complexContent>
</complexType>
```

Name	Definition
Condition	Condition as defined by MPEG-21 DID.
Descriptor	The Descriptor(s) of the PreservationObject. See 5.2.1.11 for permitted descriptor types. At least one ExploitationRightsDescriptor should be present.
Choice	Choice as defined by MPEG-21 DID.
Item	Item may be of type PreservationObject or Representation only.
uri	URI identifying the Asset. URI may be abbreviated as relative URIs, if they have the document URI as base URI.

5.2.1.4 Representation

See 4.2.5.

Relations

— Representation aggregates 0..n Essences

5.2.1.4.1 RepresentationType

A Representation of a Preservation Object.

```
<complexType name="RepresentationType">
  <complexContent>
   <extension base="mpaf:ItemType">
    <sequence>
     <element name="Condition" type="didmodel:ConditionType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Choice" type="didmodel:ChoiceType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Item" type="mpaf:EssenceType" minOccurs="0" maxOccurs="unbounded">
     </element>
    </sequence>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
Condition	Condition as defined by MPEG-21 DID.
Descriptor	The Descriptor(s) of the PreservationObject. See 5.2.1.11 for permitted descriptor types.
Choice	Choice as defined by MPEG-21 DID.
Item	Item shall be of type Essence.

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5.2.1.5 Essence

See 4.2.6.

Relations

— Essence aggregates 0..n Components

5.2.1.5.1 EssenceType

```
<complexType name="EssenceType">
  <complexContent>
   <extension base="mpaf:ItemType">
    <sequence>
     <element name="Condition" type="didmodel:ConditionType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Choice" type="didmodel:ChoiceType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Component" type="mpaf:ComponentType" minOccurs="0"
maxOccurs="unbounded">
     </element>
    </sequence>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
Condition	Condition as defined by MPEG-21 DID.
Descriptor	The Descriptor(s) of the Essence. See 5.2.1.11 for permitted descriptor types.
Choice	Choice as defined by MPEG-21 DID.
Component	The Component(s) of the Essence.

5.2.1.6 Component

A component is the binding of a resource to a set of metadata. A component itself is not an Item; components are building blocks of Items. See 4.1.5.

This entity is abstract, only its specializations may be instantiated. File and Bitstream are specializations of Components containing Media Locators that point to digital resources or analog sources.

Relations

— Component aggregates 1..n Resources

5.2.1.6.1 ComponentType

Base type for Components.

```
<complexType name="ComponentType" abstract="true">
  <complexContent>
   <extension base="didmodel:ComponentType">
    <sequence>
     <element name="Condition" type="didmodel:ConditionType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Resource" type="mpaf:MediaLocatorType" minOccurs="1"
maxOccurs="unbounded">
```


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```
      </element>
     </sequence>
     <attributeGroup ref="mpaf:ID_ATTRS" />
     <attribute name="uri" type="anyURI">
     </attribute>
    </extension>
   </complexContent>
</complexType>
```

Name	Definition
Condition	Condition as defined by MPEG-21 DID.
Descriptor	The Descriptor(s) of the Component. See 5.2.1.11 for permitted descriptor types.
Resource	The MediaLocator(s) of the component.
Uri	URI identifying the Commponent. URI may be abbreviated as relative URIs, if they have the document URI as base URI.
ID_ATTRS	

5.2.1.7 File

See 4.2.8.

5.2.1.7.1 FileType

A Component of type File.

```
<complexType name="FileType">
  <complexContent>
   <extension base="mpaf:ComponentType" />
  </complexContent>
</complexType>
```

5.2.1.8 Bitstream

See 4.2.9.

5.2.1.8.1 BitstreamType

A Component of type Bitstream.

```
<complexType name="BitstreamType">
  <complexContent>
   <extension base="mpaf:ComponentType" />
  </complexContent>
</complexType>
```

5.2.1.9 Media Locator

A reference to a (physical/digital) Resource (see 4.1.2). See 4.2.10.

5.2.1.9.1 MediaLocatorType

A Media Locator of a Component.

```
<complexType name="MediaLocatorType">
  <complexContent>
   <extension base="mpaf:ResourceBaseType" />
  </complexContent>
</complexType>
```

5.2.1.10 Group

A Container (see 4.1.3) of Preservation Objects. See 4.2.4.

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5.2.1.10.1 GroupType

A group of Preservation Objects. Grouping may be nested. It adds a URI identifier to the DID model type.

```
<complexType name="GroupType">
  <complexContent>
   <extension base="didmodel:ContainerType">
    <sequence>
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <choice minOccurs="1" maxOccurs="unbounded">
      <element name="Container" type="mpaf:GroupType" />
      <element name="Item" type="mpaf:PreservationObjectType" />
     </choice>
    </sequence>
    <attribute name="uri" type="anyURI">
    </attribute>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
`Descriptor`	The Descriptor(s) of the Component. See 5.2.1.11 for permitted descriptor types.
`uri`	URI identifying the Group. URI may be abbreviated as relative URIs, if they have the document URI as base URI.

5.2.1.11 Descriptor

See 4.1.6.

Table 1 provides an overview indicating to which content entities each preservation metadata descriptor can apply. Descriptors not supported on an entity shall be added to the parent entity (the columns in the table are ordered from parent to child from left to right).

Descriptors are not supported on entities, when the properties being described cannot be different than for the parent entity. The Context is the same for all the constituent parts of a Preservation Object, a specific Representation or Essence cannot exist outside the context of the object. Verifying Authenticity requires at least a complete Representation, thus describing it below this level is not useful. On the level of a single File or Bitstream only Identification, Quality and Fixity may be specific; other properties are shared on Essence level. In addition, Annotations can be made on arbitrary level.

Table 1 — Usage of preservation metadata descriptors in different Digital Item and Component Entities

	Digital Item			Component
	Preservation Object	Representation	Preservation Object	Representation
Identification	+	+	+	+
Provenance	+	+	+	-
Context	+	-	-	-
Reference	+	+	+	-
Quality	+	+	+	+
Integrity	+	+	+	-
Authenticity	+	+	-	-
Fixity	+	+	+	+
Rights	+	+	+	-
Annotation	+	+	+	+

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5.2.1.11.1 DescriptorBaseType

Base type for MP-AF Descriptors. This is the common ancestor of the generic MP-AF Descriptor (see below) and the specialized Descriptor types defined in 5.3.3, which constrain the Statement element to the appropriate types for each of the Descriptors.

```
<complexType name="DescriptorBaseType" abstract="true">
  <complexContent>
   <extension base="didmodel:DescriptorType">
    <sequence>
     <element name="Condition" type="didmodel:ConditionType" minOccurs="0"
maxOccurs="unbounded">
     </element>
     <element name="Descriptor" type="didmodel:DescriptorType" minOccurs="0"
maxOccurs="unbounded">
     </element>
    </sequence>
    <attributeGroup ref="mpaf:ID_ATTRS" />
    <attribute name="uri" type="anyURI" use="optional">
    </attribute>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
`Condition`	Condition as defined by MPEG-21 DID.
`Descriptor`	Nesting of descriptors in only allowed for specific types as described in 5.3.5.
`uri`	URI identifying the Descriptor. URI may be abbreviated as relative URIs, if they have the document URI as base URI.
`ID_ATTRS`	Generic ID attribute. For compatibility with MPEG-21 DID. The use of the `uri` attribute to provide URIs as identifier for entities is strongly recommended.

5.2.1.11.2 DescriptorType

Type for generic MP-AF Descriptor, containing a generic MP-AF Statement. This type serves as an extension point for additional preservation descriptors not defined in this part of ISO/IEC 23000.

```
<complexType name="DescriptorType">
  <complexContent>
   <extension base="mpaf:DescriptorBaseType">
    <sequence>
     <element name="Statement" type="mpaf:StatementType" minOccurs="1">
     </element>
    </sequence>
   </extension>
  </complexContent>
</complexType>
```

Name	Definition
`Statement`	The DID statement containing/referencing the payload of the descriptor.

5.2.1.11.3 StatementType

Statement holding contents of a descriptor. If the descriptor is contained inline, it shall conform to the XML representation defined in this part of ISO/IEC 23000. Referenced descriptors should conform to this representation. If they use a different representation, the representation attribute shall be present. Inline descriptors and referencing are mutually exclusive, i.e. if the descriptor content is present, the ref attribute shall not be used and vice versa.

```
<complexType name="StatementType" mixed="false">
  <complexContent>
   <extension base="didmodel:StatementType">
    <attribute name="mimeType" type="string" use="required">
    </attribute>
    <attribute name="ref" type="anyURI
```

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