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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

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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

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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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