

TECHNICAL REPORT

**ISO/IEC
TR
21000-1**

Second edition
2004-11-01

Information technology — Multimedia framework (MPEG-21) —

Part 1: Vision, Technologies and Strategy

*Technologies de l'information — Cadre multimédia (MPEG-21) —
Partie 1: Vision, technologies et stratégie*
**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

ISO/IEC TR 21000-1:2004

<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

Reference number
ISO/IEC TR 21000-1:2004(E)



© ISO/IEC 2004

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC TR 21000-1:2004](https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004)

<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

© ISO/IEC 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	v
Executive Summary.....	vii
Introduction.....	viii
1 Scope.....	1
2 Terms and definitions.....	1
3 Symbols and abbreviated terms.....	2
4 Structure of the Technical Report.....	5
5 Overview.....	5
5.1 Problem Statement.....	5
5.2 Solution Statement.....	5
5.3 Normative Implications.....	6
5.4 Conformance and Reference Software.....	6
5.5 Description of a Multimedia Framework Architecture.....	6
5.5.1 Introduction.....	6
5.5.2 Digital Items.....	7
5.5.3 Users.....	7
5.6 Example MPEG-21 Use Case.....	7
5.6.1 Introduction.....	7
5.6.2 Enabling MPEG-21 Technologies.....	8
5.7 Collaboration with other multimedia standardisation initiatives.....	10
6 About ISO/IEC 21000-1:2001.....	10
7 Overview of the MPEG-21 Parts.....	11
7.1 Introduction.....	11
7.2 Part 1 – Vision, Technologies and Strategy.....	11
7.3 Part 2 – Digital Item Declaration (DID).....	11
7.4 Part 3 – Digital Item Identification (DII).....	12
7.5 Part 4 – Intellectual Property Management and Protection (IPMP).....	12
7.6 Part 5 – Rights Expression Language (REL).....	12
7.7 Part 6 – Rights Data Dictionary (RDD).....	13
7.8 Part 7 – Digital Item Adaptation (DIA).....	14
7.9 Part 8 – Reference Software.....	14
7.10 Part 9 – File Format.....	14
7.11 Part 10 – Digital Item Processing (DIP).....	15
7.12 Part 11 – Evaluation Methods for Persistent Association Technologies.....	15
7.13 Part 12 – Test Bed for MPEG-21 Resource Delivery.....	15
7.14 Part 13 – Scalable Video Coding.....	15
8 MPEG-21 Achievements.....	16
8.1 Introduction.....	16
8.2 ISO/IEC 21000-2: Digital Item Declaration (DID).....	16
8.2.1 Goal.....	16
8.2.2 Rationale.....	16
8.2.3 Key concepts and basic approach.....	17
8.3 ISO/IEC 21000-3: Digital Item Identification (DII).....	20
8.3.1 Goal.....	20
8.3.2 Rationale.....	20
8.3.3 Key concepts and basic approach.....	20
8.4 ISO/IEC 21000-5: Rights Expression Language (REL).....	20

8.4.1	Goal.....	20
8.4.2	Rationale	20
8.4.3	Key concepts and basic approach	21
8.5	ISO/IEC 21000-6: Rights Data Dictionary (RDD).....	22
8.5.1	Goal.....	22
8.5.2	Rationale	22
8.5.3	Key concepts	23
8.6	ISO/IEC 21000-7: Digital Item Adaptation (DIA).....	23
8.6.1	Goal.....	23
8.6.2	Rationale	24
8.6.3	Key concepts and basic approach	24
9	Highlights of the MPEG-21 Parts under Development	25
9.1	Introduction.....	25
9.2	ISO/IEC 21000-10: Digital Item Processing.....	25
9.2.1	Goal.....	25
9.2.2	Rationale	26
9.2.3	Key Concepts.....	26
9.3	ISO/IEC 21000-11: Evaluation Methods for Persistent Association Technologies	27
9.3.1	Goal.....	27
9.3.2	Rationale	27
9.3.3	Key concepts	27
9.4	ISO/IEC 21000-12: Test Bed for MPEG-21 Resource Delivery	28
9.4.1	Goal.....	28
9.4.2	Rationale	28
9.4.3	Key Concepts.....	28
Annex A (informative)	List of Activities Related to the Multimedia Framework.....	30
Bibliography.....		38

ITeH STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, the joint technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

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.

ISO/IEC TR 21000-1, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC TR 21000-1:2001), which has been technically revised.

ISO/IEC 21000 consists of the following parts, under the general title *Information technology — Multimedia framework (MPEG-21)*:

- *Part 1: Vision, Technologies and Strategy [TR]*
- *Part 2: Digital Item Declaration*
- *Part 3: Digital Item Identification*
- *Part 5: Rights Expression Language*
- *Part 6: Rights Data Dictionary*

ISO/IEC TR 21000-1:2004(E)

- *Part 7: Digital Item Adaptation*
- *Part 8: Reference Software*
- *Part 9: File Format*
- *Part 11: Evaluation Tools for Persistent Association Technologies [TR]*

The following part is under preparation:

- *Part 10: Digital Item Processing*

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC TR 21000-1:2004](https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004)

<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

Executive Summary

Currently, multimedia technology provides content creators and consumers with a myriad of coding, access and distribution possibilities. At the same time, communication infrastructure is being put into place to enable access to information and multimedia services from almost anywhere at anytime. Still, no global end-to-end solutions exist allowing all different user communities to interact in an interoperable way. This lack of interoperable (and thus standardized) solutions is stalling the deployment of advanced multimedia packaging and distribution applications although most of the individual technologies are indeed already present.

This motivated MPEG (ISO/IEC JTC1 SC29 WG11) in June 2000 to start to work on the definition of enabling normative technology for the multimedia applications of the 21st century: MPEG-21 "Multimedia Framework". MPEG-21's approach is to define a framework to support transactions that are interoperable and highly automated, specifically taking into account Intellectual Property Management and Protection requirements and targeting multimedia access and delivery using heterogeneous networks and terminals. The significant progress that was made in developing MPEG-21 since the publication of first edition of this Technical Report in 2001 (ISO/IEC 21000-1:2001) has led to this updated version.

Based on the above observations, MPEG-21 aims at defining a normative albeit open framework for multimedia creation and sharing for use by all the players in the delivery and consumption chain. This open framework will provide content creators and service providers with equal opportunities in the MPEG-21 enabled open market. This will also be to the benefit of the content consumer providing them access to a large variety of content in an interoperable manner.

The MPEG-21 vision can thus be summarized as follows: *to define a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices used by different communities.*

MPEG-21 identifies and defines the normative technologies needed to support the multimedia delivery chain as described above as well as the relationships between and the operations supported by them. Within the parts of MPEG-21, these elements are elaborated by defining the syntax and semantics of their characteristics, such as interfaces to the elements.

Part 1 of MPEG-21 (ISO/IEC 21000-1) provides:

- a) A *vision* for a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices to meet the needs of all Users¹⁾.
- b) A method to facilitate the integration of components and standards in order to harmonise *technologies* for the creation, management, manipulation, transport, distribution and consumption of content.
- c) A *strategy* for achieving a multimedia framework by the development of specifications and standards based on well-defined functional requirement through collaboration with other bodies.

1) A User is any entity that interacts in the MPEG-21 environment or makes use of a Digital Item (all capitalised terms are used as defined in Clause 2).

Introduction

End users' appetite for content and the accessibility of information is increasing at an incredible pace. Access devices, with a myriad set of different terminal and network capabilities, are making their way into end users' lives. Additionally, these access devices are used in different locations and environments. Their users, however, are currently not given tools to deal efficiently with all the intricacies of this new multimedia usage environment.

Enabling "ease of use" is becoming increasingly important as individuals are producing more and more digital media for their personal use and for sharing among family and friends (as is evidenced by the large number of amateur music, photo and media sharing web sites). These amateur "content providers" have many of the same concerns as commercial content providers (management of content, re-purposing of content based on consumer/device capabilities, protection of rights, protection from unauthorised access/modification, protection of privacy of providers and consumers, etc.).

Such developments provide new models for distributing and trading digital content electronically in addition to existing business models for trading physical goods. Such new business models mean that the boundaries between the delivery of audio sound (music and spoken word), accompanying artwork (graphics), text (lyrics), video (visual) and synthetic spaces will become increasingly blurred. Indeed, it is becoming increasingly difficult to identify the different intellectual property rights that are associated with multimedia content. New solutions are required to manage the access and delivery process of these different content types in an integrated and harmonized way, entirely transparent to the user of multimedia services.

This motivates the MPEG-21 Multimedia Framework initiative that aims to enable transparent and augmented use of multimedia resources across a wide range of networks and devices, specifically taking into account Intellectual Property Management and Protection and the heterogeneity of the access and delivery infrastructure.

<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

Information technology — Multimedia framework (MPEG-21) —

Part 1: Vision, Technologies and Strategy

1 Scope

This Technical Report has been prepared within ISO/IEC JTC 1/SC 29/WG 11 to reflect the progress made on the definition of the MPEG-21 Multimedia Framework. This progress is a result of the combination of WG 11's efforts to standardise the parts of the multimedia framework where it has the appropriate expertise, and the integration with standards initiatives which are being developed by other bodies. The intention of this collaborative approach is to maximise harmonisation of efforts and enable effective standards solutions to be implemented in the shortest possible time.

The Technical Report is introduced by a problem statement and a solution statement. The problem statement describes a multimedia usage environment founded upon ubiquitous networks that is encouraging new business models for trading digital content. In this environment, the distinction between content types is less clear as their integration as multimedia resources in new products and services makes the traditional boundaries less distinct. In addition, individuals are becoming increasingly aware of the value, both commercial and intrinsic, of their own digital asset resources and new possibilities presented by the tools which enable them to create and collect, package and distribute content. The solution statement introduces the vision of the Multimedia Framework to support transactions that are interoperable and highly automated, which is required to support these new types of commerce.

This MPEG-21 Multimedia Framework is based on two essential concepts: the definition of a fundamental unit of distribution and transaction (the Digital Item) and the concept of Users interacting with Digital Items. The Digital Items can be considered the “what” of the Multimedia Framework (e.g., a video collection, a music album) and the Users can be considered the “who” of the Multimedia Framework.

The goal of MPEG-21 can be phrased as: defining the technology needed to support Users to exchange, access, consume, trade and otherwise manipulate Digital Items in an efficient, transparent and interoperable way. This Technical Report gives an overview of the technologies that have been identified to enable this goal (and that are consequently being reflected into the different parts of the MPEG-21 standard).

In creating its definition of a multimedia framework and in making its proposals and recommendations for further standardisation, MPEG-21 is taking into account other related multimedia activities. The Technical Report identifies other multimedia initiatives that are currently in progress that are considered as candidates for future interaction and collaboration with the standards work plan agreed by MPEG-21 (see also Annex A).

2 Terms and definitions

For the purposes of this Technical Report, the following terms and definitions apply:

2.1

Abstraction

Distinct intellectual or artistic creation or concept.

2.2

Asset

Manifestation, i.e. a physical or digital embodiment of an Expression.

2.3

Digital Item

Structured digital object with a standard representation, identification and metadata within the MPEG-21 framework. [ISO/IEC 21000-2]

NOTE: This entity is also the fundamental unit of distribution and transaction within this framework.

2.4

End User

User taking the role of consumer, i.e. being at the end of a value or delivery chain

EXAMPLE: a human consumer, an agent operating on behalf of a human consumer, etc.

NOTE: "User" refers to all participants in the value or delivery chain.

2.5

Expression

Intellectual or artistic realisation of an Abstraction.

2.6

Manifestation

The physical or digital embodiment of an Expression.

2.7

Peer

Device or application that compliantly processes a Digital Item²⁾.

2.8

Resource

Individually identifiable Asset such as a video or audio clip, an image, or a textual Asset. [ISO/IEC 21000-2]

NOTE: A Resource may also potentially be a physical object.

2.9

User

Any entity that interacts in the MPEG-21 environment or makes use of Digital Items.

EXAMPLE: Creator, rights holders, distributors and consumers of Digital Items.

3 Symbols and abbreviated terms

List of symbols and abbreviated terms

3.1

API

Application Program Interface

2) The term "Terminal" is usually avoided within the MPEG-21 documents because of its connotation as being the end point in a chain of communication. Besides such applications, the term Peer explicitly also includes devices or applications that create or alter Digital Items, and that handle Digital Items "in transit". How compliance will be achieved is currently being discussed.

3.2

CATV

Community Aerial Television

3.3

CD

Compact Disc

3.4

DI

Digital Item

3.5

DIA

Digital Item Adaptation

3.6

DIBO

Digital Item Base Operations

3.7

DID

Digital Item Declaration

3.8

DII

Digital Item Identification

3.9

DIP

Digital Item Processing

iTeh STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

3.10

DIME

Digital Item Method Engine

3.11

DMIF

Multimedia Integration Framework

3.12

DVB

Digital Video Broadcasting

3.13

ECMA

European Computer Manufacturer Association

3.14

HTML

Hypertext Mark-up Language

3.15

ID

IDentifier

3.16

IEEE

Institute of Electrical and Electronic Engineers

3.17
IPMP
Intellectual Property Management and Protection

3.18
ITU
International Telecommunication Union

3.19
JPEG
Joint Photographic Experts Group

3.20
MHP
Multimedia Home Platform

3.21
LAN
Local Area Network

3.22
MIDI
Musical Industry Digital Interface

3.23
MPEG
Motion Picture Experts Group

3.24
MSF
Multiservice Switching Forum

3.25
QoS
Quality of Service

3.26
RDD
Rights Data Dictionary

3.27
REL
Rights Expression Language

3.28
SNR
Signal to Noise Ratio

3.29
TR
Technical Report

3.30
TV
TeleVision

3.31
XML
eXtensible Mark-up Language

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-f98dc99daee3/iso-iec-tr-21000-1-2004>

4 Structure of the Technical Report

The Technical Report is introduced by a problem statement and a solution statement. The problem statement describes a multimedia usage environment founded upon ubiquitous networks that is encouraging new business models for trading digital content. The solution statement introduces the vision of the Multimedia Framework to support transactions that are interoperable and highly automated, which is required to support these new types of commerce.

Then, the two essential concepts of the Multimedia Framework are introduced: the definition of a fundamental unit of distribution and transaction (the Digital Item) and the concept of Users interacting with Digital Items.

Clause 6 provides some brief background on the first edition of this document (ISO/IEC 21000-1:2001). In that document, seven architectural key elements needed to support MPEG-21's goals have been identified. These architectural key elements eventually lead to the formulation of requirements for the different MPEG-21 parts.

Following the publication of first edition of this Technical Report in 2001 (ISO/IEC 21000-1:2001), various Calls for Proposals based upon requirements have been and are being issued by MPEG. Eventually the responses to the calls result in different parts of the MPEG-21 standard (i.e. ISO/IEC 21000-N) after intensive discussion and harmonization efforts. Clause 7 provides a high-level overview of all MPEG-21 parts defined so far.

Clause 8, "MPEG-21 Achievements" lists those MPEG-21 parts that have already reached Final Draft International Standard (FDIS) or Technical Report (TR) status, obviously excluding this document. For each part, the goal and the rationale are listed. Consequently, the resulting key concepts and basic approach are presented. Finally, Clause 9 highlights those MPEG-21 parts that are currently well advanced in MPEG-21.

iTech STANDARD PREVIEW
(standards.iteh.ai)

5 Overview

5.1 Problem Statement

[ISO/IEC TR 21000-1:2004](https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-098dc99dae3/iso-iec-tr-21000-1-2004)

[https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-](https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-098dc99dae3/iso-iec-tr-21000-1-2004)

[098dc99dae3/iso-iec-tr-21000-1-2004](https://standards.iteh.ai/catalog/standards/sist/606ac05d-433d-4b7e-95da-098dc99dae3/iso-iec-tr-21000-1-2004)

End users' appetite for content and the accessibility of information is increasing at an incredible pace. Access devices, with a myriad set of differing terminal and network capabilities, are making their way into end users' lives. Additionally, these access devices are used in different locations and environments. Their users, however, are currently not given tools to deal efficiently with all the intricacies of this new multimedia usage environment.

Enabling "ease of use" is becoming increasingly important as individuals are producing more and more digital media for their personal use and for sharing among family and friends (as is evidenced by the large number of amateur music, photo and media sharing web sites). These "content providers" have many of the same concerns as commercial content providers (management of content, re-purposing content based on consumer/device capabilities, protection of rights, protection from unauthorised access/modification, protection of privacy of providers and consumers, etc.).

Such developments rewrite existing business models for trading physical goods with new models for distributing and trading digital content electronically. Indeed, it is becoming increasingly difficult to identify the different intellectual property rights that are associated with multimedia content. The boundaries between the delivery of audio sound (music and spoken word), accompanying artwork (graphics), text (lyrics), video (visual) and synthetic spaces will become increasingly blurred. New solutions are consequently required to manage the access and delivery process of these different content types in an integrated and harmonized way, entirely transparent to the user of multimedia services.

5.2 Solution Statement

Normative technology is required to enable interoperable new multimedia usage cases. MPEG's approach is to define a Multimedia Framework to ensure that the systems that deliver multimedia content are *interoperable* and that transactions are simplified and, if possible, *automated*. This should apply to the infrastructure