

TECHNICAL SPECIFICATION

**Multimedia systems and equipment for metaverse -
Part 2: Classification**

CONTENTS

FOREWORD	2
INTRODUCTION	4
1 Scope	5
2 Normative references	5
3 Terms, definitions, and abbreviated terms	5
3.1 Terms and definitions	5
3.2 Abbreviated terms	6
4 General considerations	6
4.1 What is metaverse?	6
4.2 Characteristics of metaverse	7
4.3 Implementation environments	7
4.4 Various examples of definitions on metaverse	9
5 Classification	9
5.1 General	9
5.2 Metaverse components	11
5.3 Classification of metaverse by CPND	13
6 Technical challenge issues	14
6.1 Content	14
6.2 Platform	16
6.3 Network	16
6.4 Device	17
Bibliography	19
Figure 1 – Classification according to CPND concept	13
Figure 2 – Classification according to CPND concept from the IEC/TC 100 perspective	14
Table 1 – Abbreviated terms	6
Table 2 – Four types according to two implementation environments	8
Table 3 – Implementation examples of metaverse	8
Table 4 – Classifications of the metaverse	9
Table 5 – Summary of the components of the metaverse	11

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Multimedia systems and equipment for metaverse -
Part 2: Classification**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TS 63614-2 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
100/4485/DTS	100/4516/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63614 series, published under the general title *Multimedia systems and equipment for metaverse*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

The term "metaverse" originated from the science fiction novel "Snow Crash" [1], combining "meta" and "universe". It refers to a digital-based virtual world that extends the boundaries of the real world, allowing users to engage in various activities, including imagination and fantasy, within the virtual space. From the viewpoint of content, platform, network, or device, the metaverse can also be defined as a technology in which a user (using a metaverse device) can access (through a network) a virtual space (a metaverse platform) and experience all activities (metaverse contents) through an avatar.

At the time of writing, the global industrial metaverse market is experiencing significant growth. It is noted that the metaverse can be implemented and realized with multimedia systems and equipment. Accordingly, there is a crucial need for standardization on the subject of metaverse in IEC Technical Committee 100 as a leading standardization group in the area of multimedia systems and equipment.

IEC Technical Committee 100 prepares International Standards and other deliverables in the field of audio, video and multimedia systems and equipment. These publications mainly include specification of the performance, methods of measurement for consumer and professional equipment and their application in systems and its interoperability with other systems or equipment.

The IEC 63614 series consists of the following parts:

- Part 1: General;
- Part 2: Classification;
- Part 3: Gap analysis; and
- Part 4: AI use case

IEC 63614-1:2026 describes general considerations to be taken for standardization on multimedia systems and equipment for metaverse.

IEC TS 63614-2 (this document) describes the classification of metaverse in terms of C (contents), P (platform), N (network), D (device).

IEC 63614-3:2026 describes the gap analysis for the existing standards on metaverse and the services/products in the metaverse-related industry.

IEC 63614-4¹ describes a survey and analysis on how to use AI technology for metaverse systems and services, including the relevant examples and expected benefits in terms of service providers and users.

¹ Under consideration.

1 Scope

This document describes the classifications and challenging technical issues to consider for standardization of multimedia systems and equipment for metaverse in the perspectives of content, platform, network, and device.

2 Normative references

There are no normative references in this document.

Bibliography

- [1] STEPHENSON, N. *Snow Crash*. Penguin, 2011
- [2] ISO/IEC DIS 24931-1, *Information technology - Metaverse - Part 1: Concepts, characteristics and terminology*
- [3] ITU Focus Group Technical Report, ITU Focus Group on Metaverse, ITU-T/FG-MV (FGMV-02-WG2-Metaverse_an analysis of definitions, 10/2023. Available from: <https://www.itu.int/en/ITU-T/focusgroups/mv/Documents/List%20of%20FG-MV%20deliverables/FGMV-02.pdf> [viewed 2026-02-27]
- [4] PARK, S.-M., KIM, Y.-G., "A Metaverse: Taxonomy, Components, Applications, and Open Challenges", IEEE Access, vol. 10, pp. 4209-4251, 2022. Available from: doi: 10.1109/ACCESS.2021.3140175. [viewed 2026-02-27]
- [5] BALL, M., "The Metaverse Primer", Online. Jun 29, 2021. Available from: <https://www.matthewball.co/> [viewed 2026-02-27]
- [6] RADOFF, J., " The Metaverse Value-Chain" Apr 7, 2021, Online. Available from: <https://meditations.metavert.io/p/the-metaverse-value-chain-afcf9e09e3a7> [viewed 2026-02-27]
- [7] <https://www.gartner.com/en/experts/think-again-series/the-metaverse>
- [8] BOBIER, J-F., et al., "The Corporate Hitchhiker's Guide to the Metaverse". Boston Consulting Group. April 2022. Online. Available from: [bcg-the-corporate-hitchhikers-guide-to-the-metaverse-27-apr-2022.pdf](https://www.bcg.com/publications/2022/the-corporate-hitchhikers-guide-to-the-metaverse-27-apr-2022) [viewed 2026-02-27]
- [9] McKinsey & Company, "Value creation in the metaverse June 2022 - The real business of the virtual world", June 2022. Online. Available from: <https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf> [viewed 2026-02-27]
- [10] Korean Government, "Metaverse New Industry Leadership Strategy", Jan., 21, 2021, https://www.researchgate.net/publication/394263221_Comparative_Soft-Law_principles_for_the_Metaverse_Balancing_Governance_and_Creator_Inclusion
- [11] TTA, "Metaverse strategy reports", Dec. 2023, <https://www.msit.go.kr/eng/bbs/view.do?sCode=eng&mId=4&mPid=2&pageIndex=&bbsSeqNo=42&nttSeqNo=621>