Technical Report

ISO/IEC TR 23090-27

Information technology — Coded representation of immersive media —

Part 27: Media and architectures for render-based systems and applications

Technologies de l'information — Représentation codée de média immersifs —

Partie 27: Médias et architectures pour les systèmes et applications basés sur le rendu graphique

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ISO/IEC TR 23090-27:2025
https://standards.iteh.ai/catalog/standards/iso/d03a034e-2b9a-414f-b92e-e6b9ca48bc61/iso-iec-tr-23090-27-2025

First edition
2025-06

Reference number
ISO/IEC TR 23090-27:2025(en)

© ISO/IEC 2025

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/IEC TR 23090-27:2025
https://standards.iteh.ai/catalog/standards/iso/d03a034e-2b9a-414f-b92e-e6b9ca48bc61/iso-iec-tr-23090-27-2025

COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Overview **4**
4.1 Motivation to develop standards for distribution of scene-based media 4
4.2 Immersive displays and their information requirements 5
4.2.1 General 5
4.2.2 Raster media, 3D graphics and information requirements of immersive displays 5
4.2.3 Defining necessary and sufficient thresholds of media information 6
4.2.4 Accommodating displays with a variety of information requirements 6
4.3 Content creation not in scope for MPEG International Standards 6
4.4 Challenges for distribution of immersive media 7
4.4.1 Interoperability between renderers 7
4.4.2 Interchange between media formats 7
4.4.3 Lack of standard specifications of media format 8

5 On the usage of Immersive Technology Media Format for media interchange **8**

6 Media workflow from content production to distribution **8**
6.1 Introduction to media workflows 8
6.2 Camera captured 9
6.3 Computer generated 9
6.4 Hybrid 9
6.5 Display considerations 10
6.6 Clarifications on media workflow terminology 10
6.6.1 Mastering format 10
6.6.2 Contribution, mezzanine, or ingest format 10
6.6.3 Distribution or last-mile format 11
6.7 Observations about media formats and variety of displays 11

7 Renderers **11**
7.1 Introduction to renderers 11
7.2 Classification of rendering methods 12
7.2.1 Real-time renderers 12
7.2.2 Non real-time or offline renderers 12
7.3 Families of rendering techniques for immersive applications 12
7.3.1 Rasterisation 12
7.3.2 Ray tracing 12
7.3.3 Hybrid 13
7.4 Other rendering considerations 13
7.4.1 Distributed and network rendering and “edge compute” 13
7.4.2 Scene compression 13
7.4.3 Anti-aliasing 13
7.4.4 Deep learning 13
7.4.5 Hardware 13
7.5 Current state of the art 14

8 Immersive displays **14**
8.1 Characterizing the immersive display 14
8.2 Fundamental output units of displays 14
8.2.1 Points of light 15
8.2.2 Rays of light 15
8.2.3 Waves of light 15
8.3 Families of displays emitting points of light 15

iTeh Standards (https://standards.iteh.ai) Document Preview
ISO/IEC TR 23090-27:2025
https://standards.iteh.ai/catalog/standards/iso/d05ab5f8-289a-4f4f-8926-5b69ca48bc61/iso-iec-tr-23090-27-2025

© ISO/IEC 2025 – All rights reserved

8.3.1 Single panel planar displays 15
8.3.2 Multi-planar displays 15
8.3.3 Volumetric displays 15
8.4 Families of displays emitting rays of light 16
8.4.1 Dense light field displays 16
8.4.2 Low density ray displays 16
8.5 Families of displays emitting waves of light 16

9 Architectures and interfaces 17
9.1 General 17
9.2 Architecture for streaming of frame-based media 17
9.3 Architecture for streaming of scene-based media 18
9.4 Hypothetical immersive display architecture 20
9.5 Architecture for scene graph representations 21
9.6 Architecture for scene graph representations with a shared asset 22
9.7 Architecture for annotated scene graph using IMS 23
9.8 Architecture for translation between scene graph representations using IMS 23
9.9 Adaptation of scene-based media to the capabilities of the client and/or to current conditions 25

10 Use cases, requirements and assumptions 26
10.1 General 26
10.2 Scenario 1 Distribution to a single immersive media client (display) 26
10.2.1 Introduction to scenario 1 26
10.2.2 Desired features for scenario 1 26
10.3 Scenario 2 Distribution to heterogeneous set of immersive media clients (displays) 26
10.3.1 Introduction to scenario 2 26
10.3.2 Desired features for scenario 2 27
10.4 Scenario 3 Distribution to both legacy and immersive media clients (displays) 27
10.4.1 Introduction to scenario 3 27
10.4.2 Desired features for scenario 3 27
10.5 Current assumptions 27

Bibliography 28

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ISO/IEC TR 23090-27:2025
https://standards.iteh.ai/catalog/standards/iso/d03a034e-2b9a-414f-b92e-e6b9ca48bc61/iso-iec-tr-23090-27-2025

© ISO/IEC 2025 – All rights reserved

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.

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 or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take 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, ISO and 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 www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of 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 www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

iTeh Standards
(https://standards.iteh.ai)

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

A list of all parts in the ISO/IEC 23090 series can be found on the ISO and IEC websites.

ISO/IEC TR 23090-27:2025

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

© ISO/IEC 2025 – All rights reserved