
**Information technology — Internet of
media things —**

**Part 1:
Architecture**

Technologies de l'information — Internet des objets media —

Partie 1: L'architecture IoMT
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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.

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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 23093 series can be found on the ISO website.

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.

Introduction

The ISO/IEC 23093 series provides an architecture and specifies application programming interfaces (APIs) and compressed representation of data flowing between media things.

The APIs for the media things facilitate discovering other media things in the network, connecting and efficiently exchanging data between media things. The APIs also provide means for supporting transaction tokens in order to access valuable functionalities, resources, and data from media things.

Media things related information consists of characteristics and discovery data, setup information from a system designer, raw and processed sensed data, and actuation information. The ISO/IEC 23093 series specifies data formats of input and output for media sensors, media actuators, media storages, media analysers, etc. Sensed data from media sensors can be processed by media analysers to produce analysed data, and the media analysers can be cascaded in order to extract semantic information.

This document does not specify how the process of sensing and analysing is carried out but specifies the interfaces between the media things. This document describes the architecture of systems for the internet of media things.

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Information technology — Internet of media things —

Part 1: Architecture

1 Scope

This document describes the architecture of systems for the internet of media things.

2 Normative references

There are no normative references in this document.

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:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1 Internet of media things terms

3.1.1 audio

anything related to sound in terms of receiving, transmitting or reproducing it or of its specific frequency

3.1.2 camera

special form of an image capture device that senses and captures photo-optical signals

3.1.3 display

visual representation of the output of an electronic device or the portion of an electronic device that shows this representation, as a screen, lens or reticle

3.1.4 gesture

movement or position of the hand, arm, body, head or face that is expressive of an idea, opinion, emotion, etc.

3.1.5 haptics

input or output device that senses the body's movements by means of physical contact with the user

3.1.6 image capture device

device which is capable of sensing and capturing acoustic, electrical or photo-optical signals of a physical entity that can be converted into an image

3.1.7

internet of media things

IoMT

special subset of *IoT* (3.2.9) whose main functionalities are related to media processing

3.1.8

IoMT device

IoT (3.2.9) device that contains more than one *MThing* (3.1.12)

3.1.9

IoMT system

MSystem

IoT (3.2.9) system whose main functionality is related to media processing

3.1.10

loudspeaker

electroacoustic device, connected as a component in an audio system, generating audible acoustic waves

3.1.11

media

data that can be rendered, including audio, video, text, graphics, images, haptic and tactile information

Note 1 to entry: These data can be timed or non-timed.

3.1.12

media thing

MThing

thing (3.2.20) capable of sensing, acquiring, actuating, or processing of media or metadata

3.1.13

media token

virtual token for accessing functionalities, resources and data of media things

3.1.14

microphone

entity capable of capture and transform acoustic waves into changes in electric currents or voltage, used in recording or transmitting sound

3.1.15

media wearable

MWearable

MThing (3.1.12) intended to be located near, on or in an organism

3.1.16

motion

action or process of changing place or position

3.1.17

natural user interface

NUI

system for human-computer interaction that the user operates through intuitive actions related to natural, everyday human behaviour

3.1.18

presentation

act of producing human recognizable output of rendered media

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functionalities, resources and data of media things
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3.2 Internet of things terms

3.2.1

actuator

component which conveys digital information to effect a change of some property of a physical entity

3.2.2

capability

characteristic or property of an entity that can be used to describe its state, appearance or other aspects

EXAMPLE An entity type, address information, telephone number, a privilege, a MAC address, a domain name are possible attributes, see Reference [1].

3.2.3

component

modular, deployable and replaceable part of a system that encapsulates implementations

Note 1 to entry: A component may expose or use interfaces (local or on a network) to interact with other entities, see Reference [2]. A component which exposes or uses network interfaces is called an endpoint.

3.2.4

digital entity

any computational or data element of an IT-based system

Note 1 to entry: It may exist as a service based in a data centre or cloud, or a network element or a gateway.

3.2.5

discovery

service to find unknown resources/entities/services based on a rough specification of the desired result

Note 1 to entry: It may be utilized by a human or another service; credentials for authorization are considered when executing the discovery, see Reference [4].

3.2.6

entity

anything (physical or non-physical) having a distinct existence

3.2.7

identifier

information that unambiguously distinguishes one *entity* (3.2.6) from another one in a given identity context

3.2.8

identity

characteristics determining who or what a person or thing is

3.2.9

internet of things

IoT

infrastructure of interconnected objects, people, systems and information resources together with intelligent services to allow them to process information of the physical and the virtual world and to react

3.2.10

interface

shared boundary between two functional components, defined by various characteristics pertaining to the functions, physical interconnections, signal exchanges, and other characteristics, as appropriate

Note 1 to entry: See Reference [5].

3.2.11

IoT system

system that is comprised of functions that provide the system the capabilities for identification, sensing, actuation, communication and management, and applications and services to a user

Note 1 to entry: See Reference [7].

3.2.12

network

entity that connects endpoints, sources to destinations, and may itself act as a value-added element in the IoT system or services

3.2.13

process

procedure to carry out operations on data

3.2.14

physical entity

thing (3.2.20) that is discrete, identifiable and observable, and having material existence in real world

3.2.15

reference architecture

description of common features, common vocabulary, guidelines, interrelations and interactions among the entities, and a template for an IoT architecture

3.2.16

resource

any element of a data processing system needed to perform required operations

Note 1 to entry: See Reference [8].

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3.2.17

sensor

device that observes and measures a physical property of a natural phenomenon or man-made process and converts that measurement into a signal

Note 1 to entry: A signal can be electrical, chemical, etc., see Reference [9].

3.2.18

service

distinct part of the functionality that is provided by an entity through interfaces

Note 1 to entry: See Reference [10].

3.2.19

storage

capacity of a digital entity to store information subject to recall or the components of a digital entity in which such information is stored

3.2.20

thing

any entity that can communicate with other entities

3.2.21

user

human or any digital entity that is interested in interacting with a particular physical object

3.2.23

visual

any object perceptible by the sense of sight

4 Architecture

The global IoMT architecture is presented in [Figure 1](#), which identifies a set of interfaces, protocols and associated media-related information representations related to:

- user commands (setup information) between a system manager and an MThing, with reference to interface 1.
- user commands (setup information) forwarded by an MThing to another MThing, possibly in a modified form (e.g., subset of 1), with reference to interface 1'.
- sensed data (raw or processed data) (compressed or semantic extraction) and actuation information, with reference to Interface 2.
- wrapped interface 2 (e.g., for transmission), with reference to interface 2'.
- MThing characteristics, discovery, with reference to interface 3.

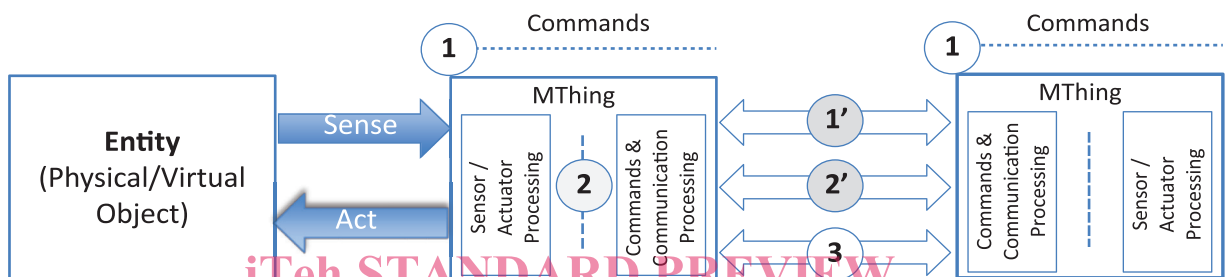


Figure 1 — IoMT architecture

This IoMT architecture can be mapped to the IoT reference architecture (Reference [4]) as shown in [Annex A](#).

5 Use cases

5.1 General

MPEG identified 27 use-cases for IoMT; they are structured in the following five main categories:

- **Smart spaces: Monitoring and control with network of audio-video cameras (see 5.2)**
 - human tracking with multiple network cameras
 - automatic title generation
 - intelligent firefighting with IP surveillance cameras
 - networked digital signs for customized advertisement
 - digital signage and second screen use
 - self-adaptive quality of experience for multimedia applications
 - ultra-wide viewing video composition
 - face recognition to evoke sensorial actuations
 - automatic video clip generation by detecting event information
 - temporal synchronization of multiple videos for creating 360° or multiple view video