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TECHNICAL REPORT

colour inside

Conceptual model for TC 100 standardization on multimedia cyber technology

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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CONCEPTUAL MODEL FOR TC 100 STANDARDIZATION ON MULTIMEDIA CYBER TECHNOLOGY

FOREWORD

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IEC TR 63289, which is a Technical Report, has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

Draft TR	Report on voting
100/3442/DTR	100/3468/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

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- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

IEC TR 61998:2015, *Model and framework for standardization in multimedia equipment and systems*, has already described cyber world applications and at the present time, some CE products with Internet service are starting to use these cyber world applications. TC 100 has only a few standards regarding this cyber world application up to now; however, now and in the future, TC 100 standardization must shift into cyber-physical systems.

"Study Session 10 – Multimedia cyber technology" was established to consider the cases of the multimedia cyber technology, including IoT or CPS, within the scope of TC 100, and proposes study items. This Technical Report explains these SS 10 studies and shows the possible future works of CPS within the scope of TC 100.

CONCEPTUAL MODEL FOR TC 100 STANDARDIZATION ON MULTIMEDIA CYBER TECHNOLOGY

1 Scope

This Technical Report describes the cases of the multimedia cyber technology, including IoT or CPS, within the scope of TC 100, and possible standardization items.

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:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
CPS
cyber-physical system
system processing physical or real world entities as a cyber world or information entities, and vice versa

3.2
SaaS
Software as a Service
software provided by cloud and server via Internet

3.3
PaaS
Platform as a Service
platform provided by cloud and server via Internet

3.4
IaaS
Infrastructure as a Service
infrastructure provided by cloud and server via Internet

4 Cyber-physical system in TC 100

The CPS model in this document is illustrated in Figure 1. A provider manages contents or services in the physical world. A provider distributes data for contents or services with cyber-physical technology. The data reaches users via a network with information technologies. The user receives contents or services with cyber-physical technologies.

The meaning of CPS, IT and IoT are generally thought of as follows:

- CPS is a system to improve efficiency of all systems, create new services and improve productivity by collecting data obtained from the physical world into cyber world, by processing and utilizing the data.
- IT is a technology related to computers and data communications.
- IoT is a mechanism of mutual control, not only through information and communications equipment, such as computers, but also through various objects existing in the physical world have a communication function, connect to the Internet and communicate with each other.

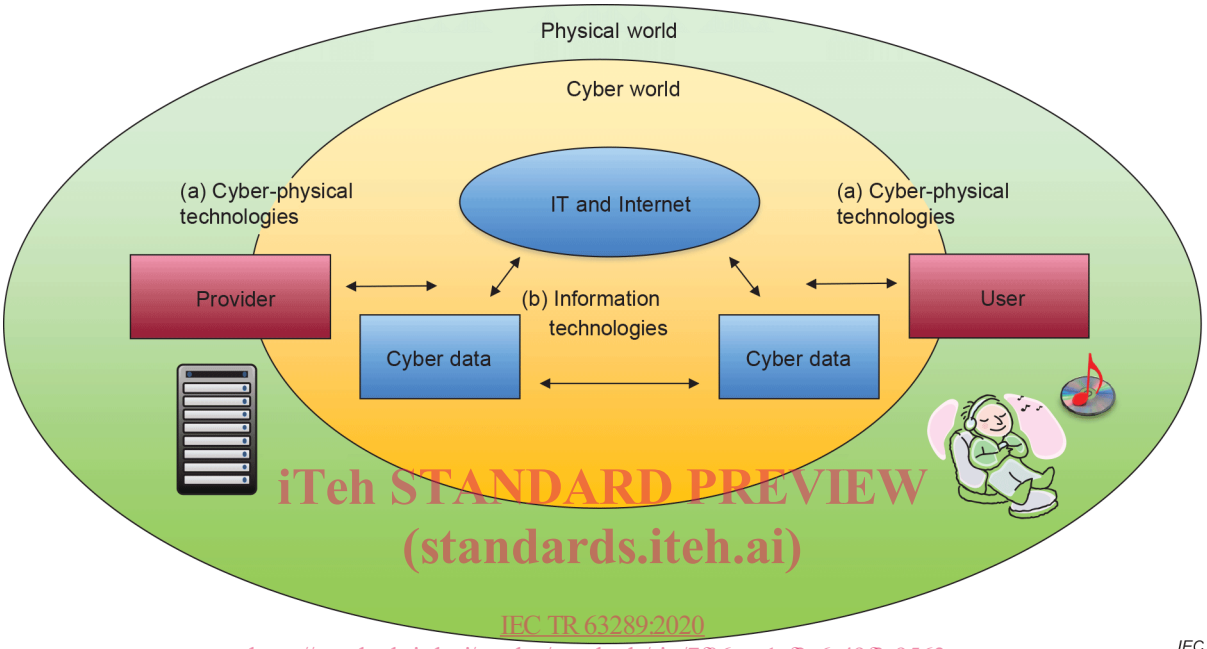

Figure 1 – Cyber-physical system model

The model from IEC 61998:2015 describes the entire system and includes CPS as shown in Figure 2. Equipment and systems in the TC 100 model exchange data through the network with the data source. The TC 100 model also shows a variety of domains such as home, car and mobile.

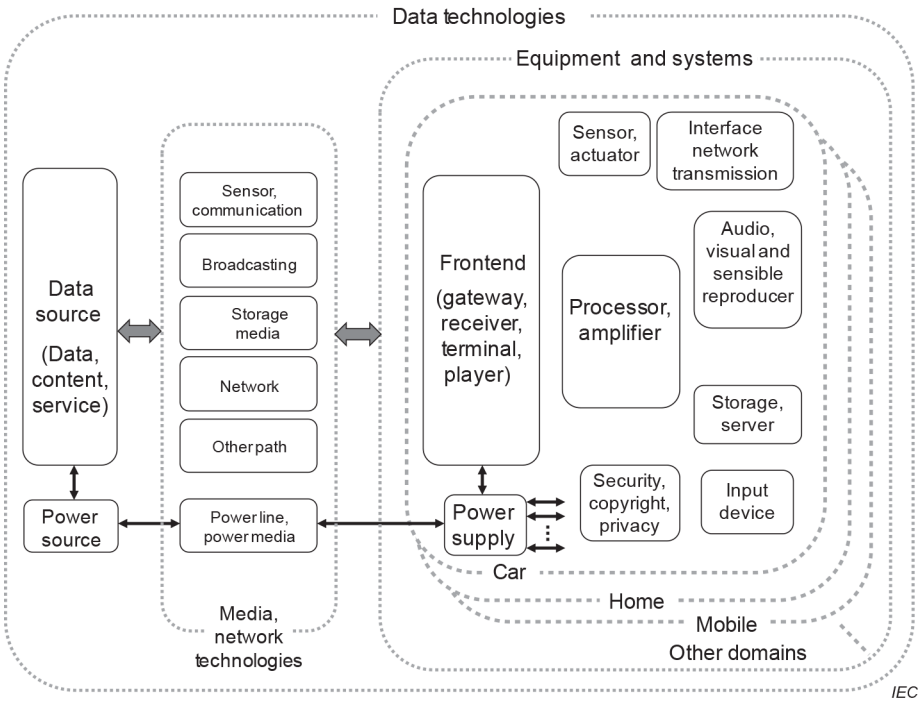

Figure 2 – TC 100 model from IEC 61998:2015

Figure 3 shows the relation between the TC 100 model and the user. This explains what causes a communication between the TC 100 model and the user, this communication is established by human senses. Audio and visual communication are the primal human senses, and other senses can communicate with the TC 100 model also.

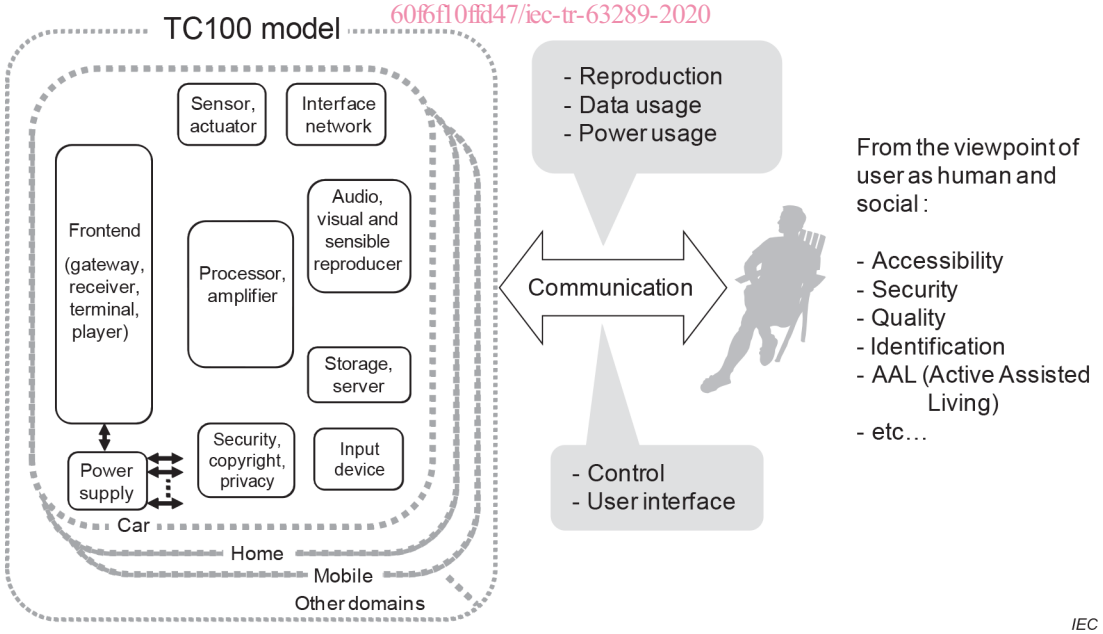

Figure 3 – TC 100 model and user communication from IEC 61998:2015

From all these models, the important essence of the TC 100 model is communication with a user resulting in a physical phenomenon. Equipment, a device or means that communicates with the physical world is a physical world entity because the user and the physical phenomenon exist in the physical world. All other equipment, devices or means can be cyber world entities.

This is the most important situation for TC 100: the legacy standardization items, such as devices and equipment that are physical entities, are replaced with cyber entities.

Current status of activities related to CPS in TC 100 is illustrated in Figure 4. The application area is not standardized yet. The platform and wide area network are standardized in other standard developing organizations. IEC TC 100 TA 18 has standardized some local area network area items, such as Network configuration. Each TA has standardized many devices.

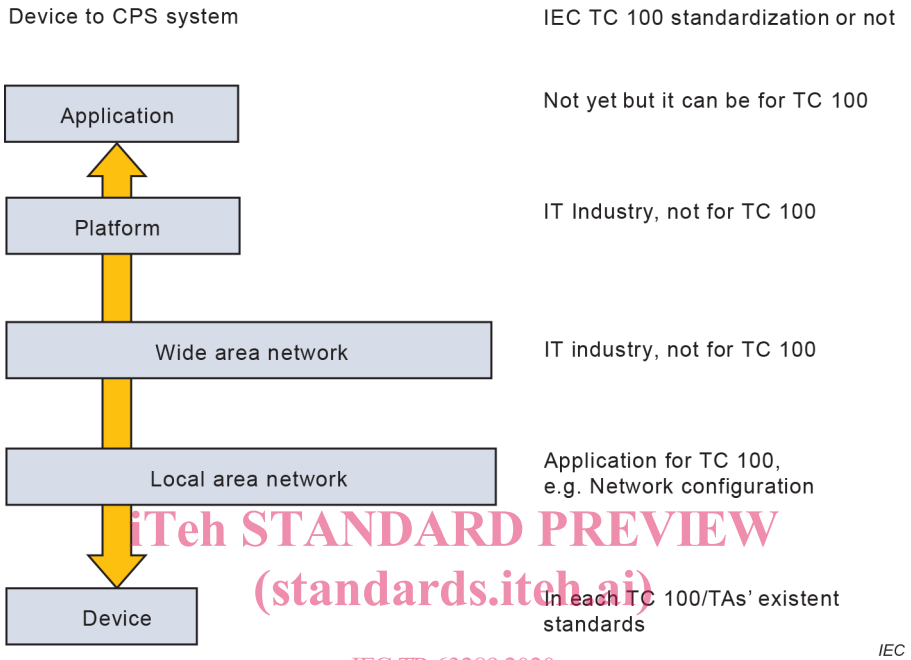

Figure 4 – Current status of activities related with cyber-physical system

In this scheme, the provider can provide not only data but also cyber equipment and cyber systems of TC 100. For instance, raw audio data can be processed to be amplified, tone controlled, filtered and edited in cyber world by cloud computing. Therefore, the only physical device that user needed is receiving data and reproducing it; any other function can be done in the cyber world. This cyber world functionality will be done by cloud services such as SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). For instance, services for audio and video are described in Clause 5.

5 Cases of audio and video services

5.1 General

Audio and video services are provided with IoT/CPS technologies, such as video/audio streaming, video/audio on demand, download, cloud storage and others. Firstly, home music service is studied as a typical TC 100 system case. Home video services and CPS are also studied to investigate the standardization area of multimedia cyber technology in TC 100.

5.2 Home music service

A typical music listening scene with CPS is shown in Figure 5. A music service provider offers its music through the network. Users can buy or subscribe to the music service and listen to it on several audio devices. Users may also upload the user's music content to the server and unify the management of the contents. Furthermore, content editing or modification will be done in the cyber system.