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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONCEPTUAL MODEL FOR TC 100 STANDARDIZATION ON MULTIMEDIA CYBER TECHNOLOGY

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IEC TR XXXXX, which is a technical report, has been prepared by subcommittee XX: TITLE, of IEC technical committee XX:

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
XX/XX/DTR	XX/XX/RVC

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

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- withdrawn,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

The National Committees are requested to note that for this document the stability date is ....

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

INTRODUCTION

IEC 61998, Model and Framework for Standardization in Multimedia Equipment and Systems, has already described the cyber world application and the current some CE products with Internet service are starting to use cyber world application. On the other hand, TC 100 has only a few standards regarding this cyber world application.

"Study Session 10 - Multimedia cyber technology" was established to explain the cases of the multimedia cyber technology including IoT or CPS within the scope of TC 100, and proposes study items.

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
term 1
definition 1

EXAMPLE 1   First example for term 1.

EXAMPLE 2   Second example for term 1.

Note 1 to entry: First note for term 1.

Note 2 to entry: Second note for term 1.

 [SOURCE: where definition 1 was found]

3.2
term 2
definition 2

EXAMPLE   Only one example for term 2 – no numbering.

Note 1 to entry: Only one note for term 2 – still needs to be numbered.

4 Overview of activities related with Cyber Physical System in TC 100

The IEC TC 100 model from IEC 61998, describes whole system, it includes Cyber Physical system as shown in Figure 1.
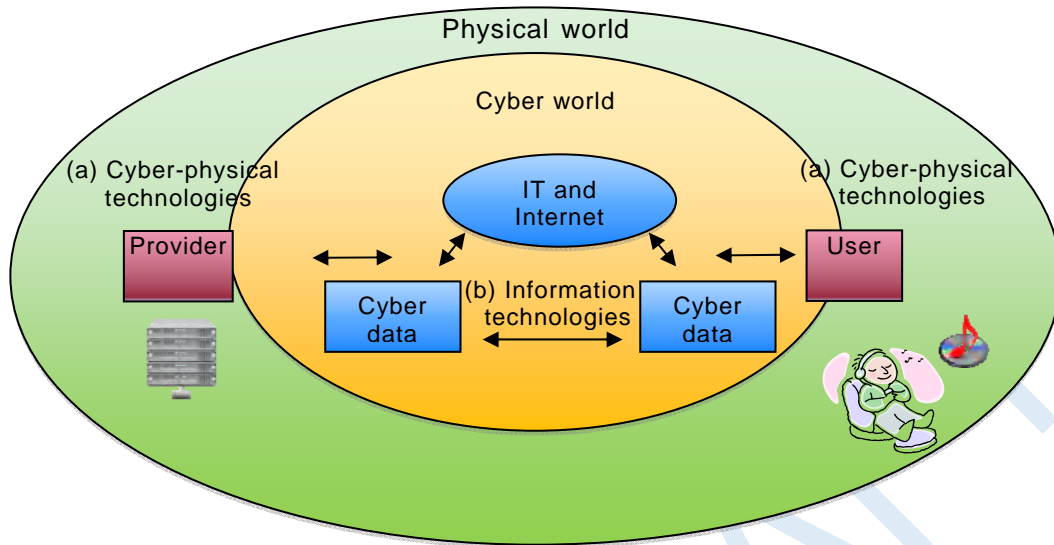
Figure 1 – TC 100 model from IEC 61988

And also, TC 100 model from IEC 61998 Edition 2 includes the cyber world application for a variety of domains as shown in Figure 2.
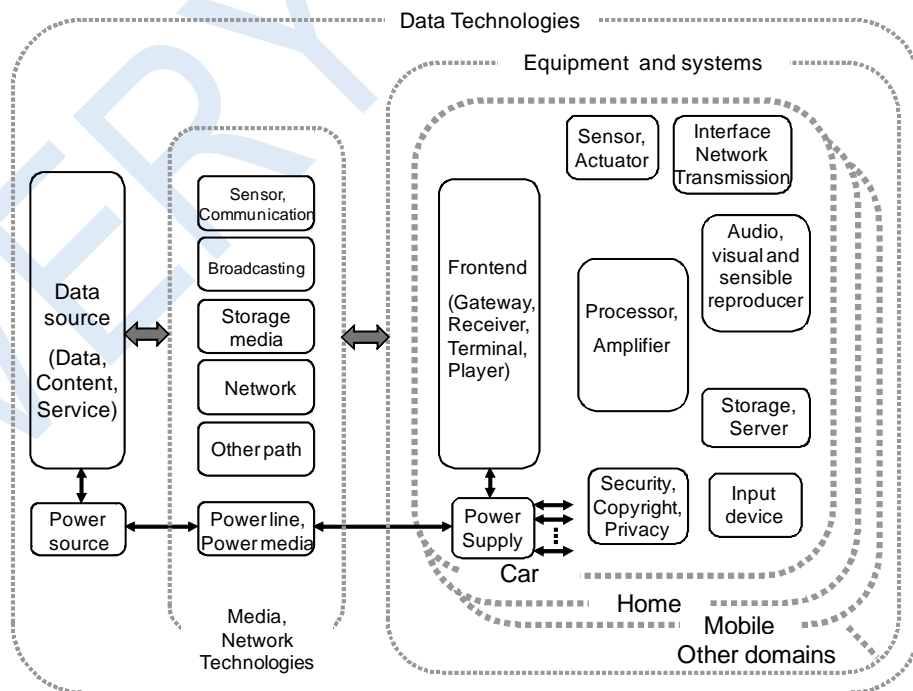

Figure 2 – TC 100 model from IEC 61998 Edition 2

Current status of activities related with cyber physical system in TC 100 is illustrated in Figure 3. Application area is not standardized yet. TA8 standardized some Local area network area items, such as ECHONET and Network configurator. Each TA standardized many devices.

Device to CPS system   **IEC TC 100 standardization**

Application	Not yet
Platform	From Industry 4.0 ?
Wide area network	Not for TC 100?
Local area network	TA 8, ECHONET, Network configurator
Device	Each TA
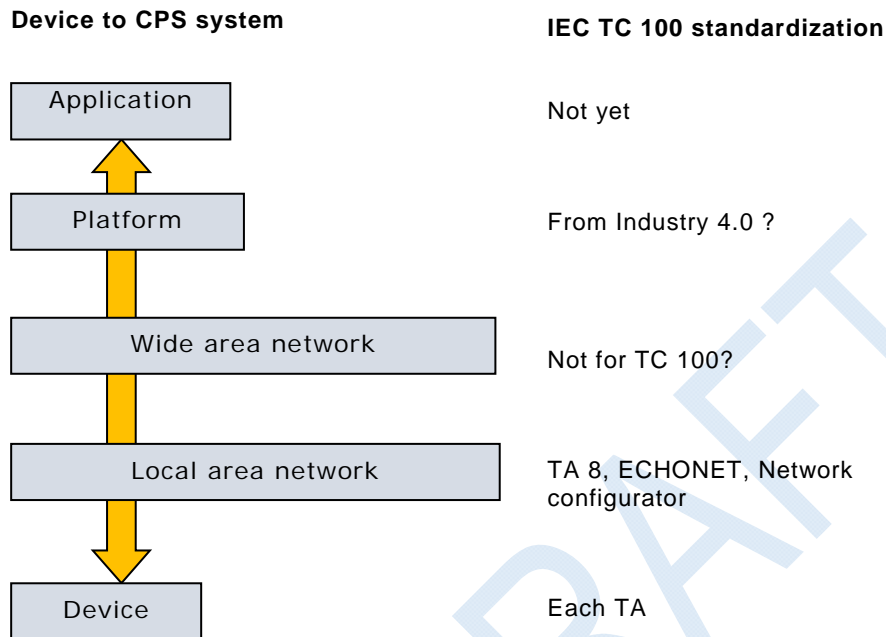
Figure 3 – Current status of activities related with cyber physical system

5   Use Case in Audio/Video services

5.1   General

Audio Video services are provided with IoT/CPS, such as VOD, Smart TV, Connected TV, Music MOD and Music Locker. eBook service provider also provides cloud service.

5.2   Movie/Music service

Typical music listening scene is shown in Figure 4. User purchase music from content provider server and user upload own contents into cloud.

Currently service is content only, other information service is quite limited. Jacket picture is provided but no liner notes, related information. Some additional information, for instance a link to related content is provided.

Figure 4 – Typical music listening scene

5.3   Home audio video system

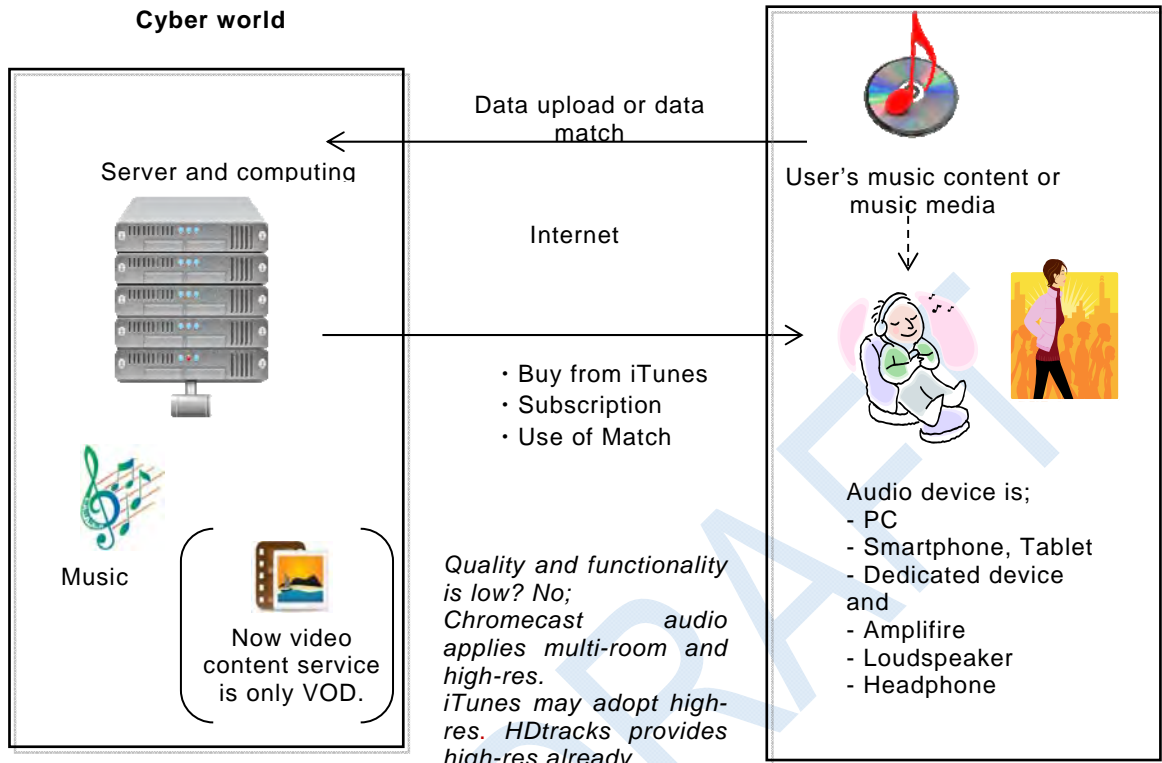The primary client of AV&IT multimedia in around 2010 was the following components; Player, STB and AV amplifier, loudspeaker or headphone, monitor device, microphone, camera and other interface devices as shown in Figure 5. The entity of content came from disk media.
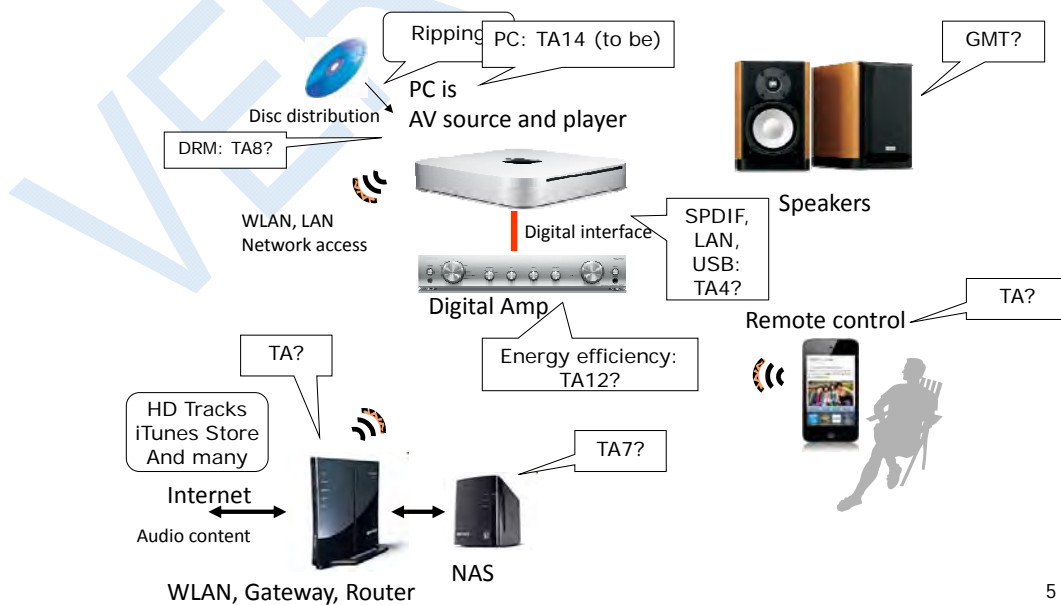

Figure 5 – The primary client of AV&IT multimedia in around 2010

Not so soon, the primary client of AV&IT multimedia will become only the following components; smart phone, smart watch, PC and AV amplifier, loudspeaker or headphone, monitor device, microphone, camera and other interface devices. There will be no player, receiver, STB as shown in Figure 6.

User's client device will be such as PC/Tablet and Smartphone or the device based on PC and Smartphone architecture. Player and STB will be disappeared, but the reproduction key device such as DAC, digital amplifier, monitor, loudspeaker will exist. Further more, AV content editing or modification will be done in cyber system.

The entity of content and service is located in cyber system such as cloud or server. Physical system is disadvantage in any cost aspect of developing, manufacturing and maintenance. Only a small part of high-end system will exist in physical.

This system makes consumer disk media and player disappeared. Also user may not need to keep physical media of music and video in home. Most of content will exist in cyber system.

Figure 6 – The primary client of AV&IT multimedia

5.4   Car audio video system

Car audio systems, consists of Car main AV device and Smartphone as showed in Figure 7, increase in the market. There are many configurations of the system. 3 types are showed in Table 1 as examples.

This system provides not only AV but also navigation and many services of Internet.

Figure 7 – Car audio systems consists of Car main AV device and Smartphone

Combination with smartphone	Provided functions
Basic AppRadio type + Smartphone	Music Player
Advanced AppRario type + Smartphone	Music, Mail, Navigation and more
AV receiver type + Smartphone + Wi-Fi transmission	Video, Audio Player

Table 1 – configurations of the system

Furthermore, Many CPS service are on the way. For example;

– HUD+AR will be launched soon

– Digital signage service is still limited

– Surround view monitor is standardized by TA 17, there will be more additional value services

– Drive monitor + CPS starts in some application

6 Use case other than Audio/Video services

6.1 General

Some use cases in Cloud applications, Big data applications and Internet data services other than audio video service are studied to investigate the standardization area of Multimedia Cyber technology within the scope of TC100.

6.2 Distribution system with IoT

IoT with IPv6 provides distributed system of content as distributed file. It also provides distributed AV & IT system and equipment.

Smartphone application also provides various IoT services with location based application, user's data based services as shown in Figure 8.
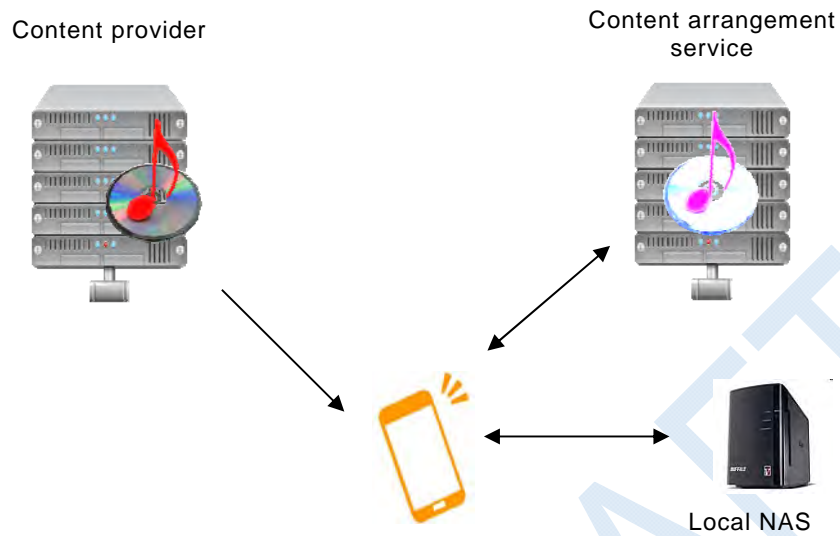
Figure 8 – An example of Distribution system with IoT

6.3   AI assisted Information services

Voice input – voice output or functional action becomes popular. Two services are shown in Figure 9 as examples. This requires a hardware of microphone-earphone (or loudspeaker) and smartphone or its like devices. This is good system as wearable smart device, it is so-called concierge service or personal assistance.
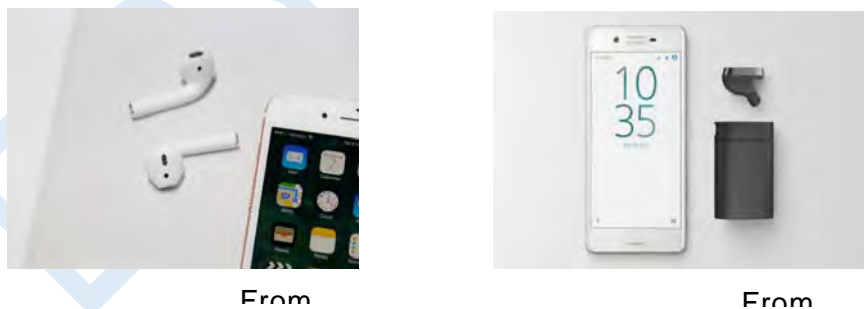
Figure 9 – Examples of AI assisted Information services

Another example of AI assisted Information service is route guidance at an event venue based on current location, personal preferences or overall trends collected from visitor's devices automatically at the event.

6.4   AAL area

There are 3 kinds of information assistance for AAL area as follows;

– Audio information assistance area: Personal assistance service Assistive listening functionality in CPS

– Visual information assistance area: Not yet but eye wear type device is expected for XR

– Cognitive assistance area: Watch service with TC 100 devices Wearable and TC 100 devices based assistance service (ex. Personal mobility with some sensors are remotely monitored as to whether the passenger is safe or not.)

6.5 SmartHome area

6.5.1 AI Speaker

AI speakers are announced by several companies. Networked home devices such as AV Receiver, TV and Room lights are controlled by voice. Speech recognition is one of key technologies.

6.5.2 Robot Technology

Robotizing makes a Home as changeable, re-configurable and fit-able system to human. The Home helps the residents. ex. If a resident wants to make windows for open-close automatically, motors are put on windows and are controlled by Smart home. It is important to make sure Safety and Interoperability at the installation.

6.6 AR/VR technologies

6.6.1 Consumer usage

AR, VR technology is used for consumer usage like video game. A variety of VR headsets have been introduced in the market. Ambisonic audio will be introduced. Various input methods are used such as hand gesture, eye/head-move tracking, haptics, etc.

6.6.2 Smart factory

XR technology including AR, VR is widely noticed not only for video game software, but also for industry area. It works in combination with hardware, software, and network as a system. This helps workers to do correct operations or to get appropriate real-time instructions.

6.7 Connected car

Visual/phonic information such as traffic flow and road map are provided based on big data collected with various sensors (location, speed, etc). Grasp driving distance and the driver's driving risk from sensors attached to the car.

Many sensors (camera, radar, etc.) are used to recognize objects, road especially for autonomous car.

6.8 Healthcare area

Service provider gathers health data such as body temperature from a user's wearable device, they analysis the data and give a recommendation of foods and body/mental care advise to the user.

6.9 Smart Farming

By measuring the outside air temperature and humidity, and the temperature and moisture content in the soil automatically, system grasps the optimum timing for seeding and shipping, and optimize water sprinkling.

6.10 Smart meter

Electric energy/Gas: The smart meter automatically measures and transmits the amount of electric energy/gas used.

Vending machine: Automatically check which drinks have been sold in vending machines, plan replenishment, and grasp the preferences in the area.

7   Possible study items

7.1   Methodology of computing AV data to provide well quality reproduction

The balance between QoS of network and AV requirement is need to be considered for well quality reproduction. Cyber Physical system is also needs to process AV data with network. E.g. Format conversion, modification of AV data

7.2   Measurement method for the minimum client devices and systems

Measurement methods for UI, IF, transmission, file format and device such as headset with eye/head-move tracking, loudspeaker for Ambisonic audio, haptics device are required for the minimum client devices and systems.

7.3   Management method for devices and systems in network

Management method for devices and systems in network is required to make sure Safety and Interoperability in cyber physical system.

7.4   Unified management method for content

Management method for content is required to fit the usage of content in cyber physical system. There are 3 key items as follows;

–   File structure (format) (e.g. Huge capacity UDF＋Network capability)

–   Meta data (e.g. permission code with enhancement of DRPC (IEC 62227))

–   Content semantics analysis and data structure (for search, manage, and application usage).

7.5   AV signal processing schemes

It is required to fit digital data processing schemes in cyber physical system.

7.6   XR technology

XR technology is one of key items to improve user experience in cyber physical system. Measurement and management method for devices and system with XR technology is required.

7.7   QoS of network

It is required to handle QoS of network such as latency, delay, status of Network. It may be required to enhance network configuration (IEC 62608).

7.8   (Big) data processing (with deep leaning or AI)

Cyber physical system such as connected car, connected device (i.e. Wearable device) will need data process (big data) to provide users new services such as concierge and infotainment. Video data through cameras installed in device will be processed to be used as a service or information. Date from wearable, health or car device is processed to provide a new service or information.

Music and video service can recognize what content is used, how used, where it was used, etc. that is information for providing a new service.

7.9   Content/data recognition or categorization including deep leaning and AI

Content/data recognition or categorization including deep leaning and AI are also required to provide automatic content arrangement service, or to provide recommended content.

Annex A
(informative/normative)

Annex title

A.1   First annex heading (optional)

Bibliography

Bibliographical reference 1

 Bibliographical reference 2

 Bibliographical reference 3

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