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**Multimedia systems – Common communication protocol for inter-connectivity
on heterogeneous networks**

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**Systèmes multimédia – Protocole de communication commun relatif à la
connectivité entre réseaux hétérogènes**

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INTERNATIONAL
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PRICE CODE
CODE PRIX

XB

ICS 33.040.40; 33.160; 35.100

ISBN 978-2-83220-244-9

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**MULTIMEDIA SYSTEMS –
COMMON COMMUNICATION PROTOCOL
FOR INTER-CONNECTIVITY ON HETEROGENEOUS NETWORKS**

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This bilingual version (2012-08) corresponds to the monolingual English version, published in 2007-11.

The text of this standard is based on the following documents:

CDV	Report on voting
100/1200/CDV	100/1283/RVC

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

The French version of this standard has not been voted upon.

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INTRODUCTION

Numerous wired and wireless home network technologies of various types have been developed and are in use today. However, since these technologies have been developed for specific functions such as control, A/V and data services, interoperability is not guaranteed among products employing these technologies. Hence, users who wish to implement the home network environment either purchase devices that are based on a single technology for interoperability or install independent, non-compatible networks in their home.

To solve these problems, home network businesses and service providers have taken into account and developed a number of specific technologies in order to allow interoperability among home network technologies. However, most of these technologies are local and offer interoperability between a limited range of devices and give rise to new problems caused by complexity and diversity in technologies of different companies.

In order to incorporate such complex and diverse technologies, there is a need to develop a new convergence technology that can integrate not only current technologies but also those expected to surface in the future.

The needs for the new convergence technology are the following:

- provide interoperability and interconnectivity among heterogeneous networks through a specific convergence layer;
- provide expandability for applications in not only current network technologies, but also new technologies to be developed in the future,
- are applicable in small devices with low processing capabilities by providing protocols such as simple signaling in the convergence layer;
- available at a low cost and simple to implement on a device;
- able to provide diverse home network services (or applications).

MULTIMEDIA SYSTEMS – COMMON COMMUNICATION PROTOCOL FOR INTER-CONNECTIVITY ON HETEROGENEOUS NETWORKS

1 Scope and object

This International Standard specifies the common communication protocol (CCP) layer that is capable of providing interoperability and interconnectivity between heterogeneous network technologies, as well as the basic data transmission scheme between devices linked to heterogeneous networks through the CCP layer. The standard also specifies the packet structure in the CCP layer and the common addressing scheme that can be understood among heterogeneous devices. Furthermore, there are specifications regarding protocols capable of providing diverse home network applications through the CCP layer such as the home network management protocol (HNMP), universal home control protocol (UHCP), home multimedia service protocol (HMSP) and home data service protocol (HDSP).

NOTE HNMP is the overall home network management protocol that detects or registers devices. UHCP controls and monitors devices from remote locations. HMSP is the A/V protocol for home entertainment services. HDSP deals with data and messaging services.

This standard is to be applied to systems with network capabilities and those that constitute home networks such as electronic appliances, A/V components, control devices, network terminals and home servers. Moreover, this standard is applicable to a home network consisting of a single home server.

This International Standard gives

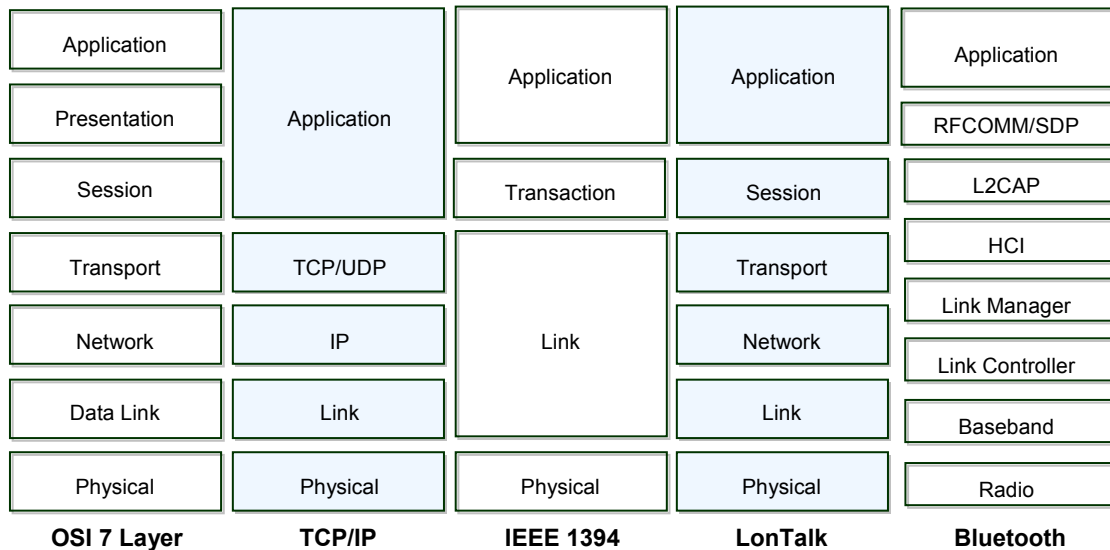
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- a definition of the CCP layer,
- a data transmission scheme in the CCP layer,
- a CCP packet structure,
- a CCP addressing scheme,
- a home network management protocol (HNMP),
- a universal home control protocol (UHCP),
- a home data service protocol (HDSP),
- requirements of home multimedia service protocol (HMSP).

A home network provides interoperability and interconnectivity regardless of the appliance manufacturer or the network type so that the user is able to receive desired services at any point in time. However, current home network technologies have independent communication protocol layer structures, as shown in Figure 1, with different addressing schemes, data transmission schemes, data processing methods and data formats.

In order to solve problems associated with interoperability and interconnectivity among heterogeneous network technologies, this standard aims to define the CCP layer as a type of a convergence layer.

Further objectives of this standard include specifying the data transmission method, packet structure and common addressing scheme as well as the signaling protocol for providing home network management, control, A/V and data services.



IEC 2072/07

Figure 1 – Communication layer structures of network technologies

2 Normative references

None.

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3 Terms, definitions, abbreviations and conventions

For the purposes of this document, the following definitions apply.

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3.1 Terms and definitions

3.1.1

CCP device

device which has networking capabilities using commercial network technologies to link to a home network; it also supports at least home network management protocol (HMNP) among four protocols provided in the CCP layer and CCP

3.1.2

CCP addressing

common addressing scheme used in the CCP layer which consists of four fields: domain address, cluster address and device ID

NOTE One of the characteristics of CCP addressing is that it has a structure that is understood by application programs embedded in devices linked to heterogeneous networks as well as the device users.

3.1.3

home server interface

HSI

interface module in a home server responsible for connection with a particular network which can process the corresponding physical interface and the communication protocol according to the type of network it is connected to

NOTE A home server interface is shown in Figure 2.

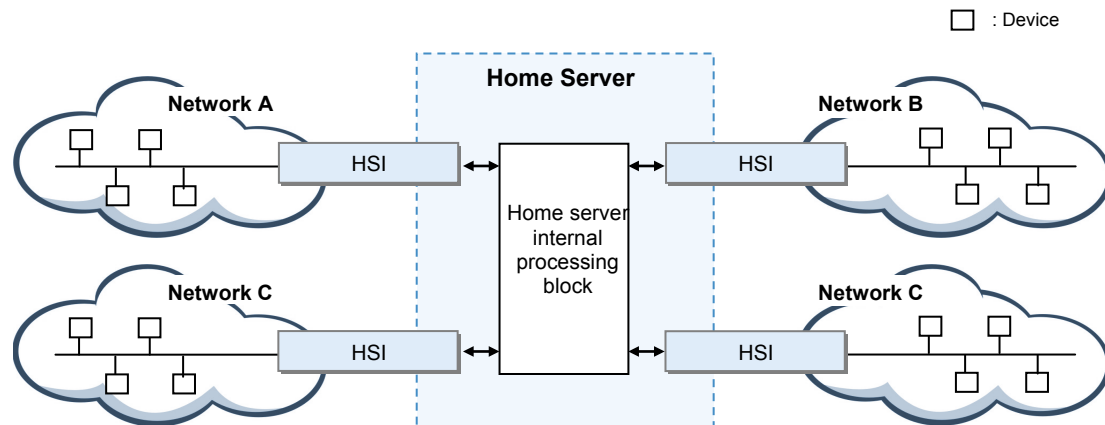


Figure 2 – Server interface

IEC 2073/07

3.1.4 cluster network

collection of devices using an identical physical interface and communication protocol

NOTE 1 As shown in Figure 3, a cluster network is a collection of devices using an identical physical interface and communication protocol. Moreover, a HSI that links a home server to the devices within the cluster network is also part of the cluster network. A cluster address is one of the CCP addressing fields defined in the CCP layer, and it is used to distinguish multiple cluster networks linked to a single home server.

NOTE 2 A HSI that links a home server to the devices within the cluster network is also part of the cluster network.

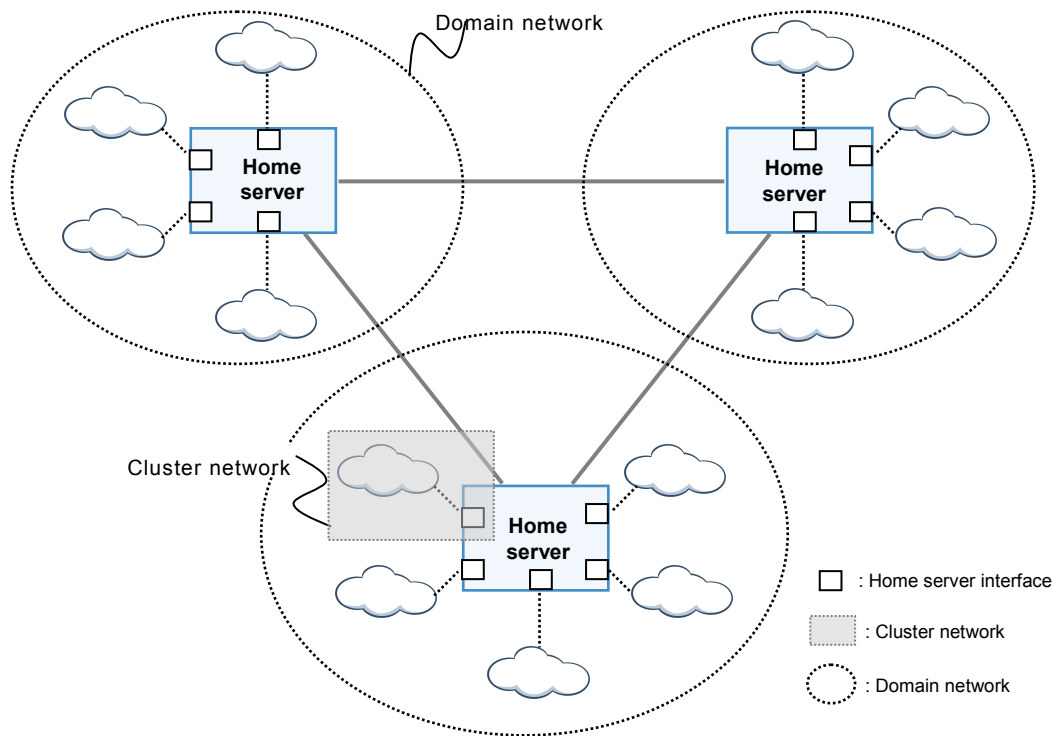
NOTE 3 A cluster network is shown in Figure 3. [IEC 62295:2007](https://standards.iteh.ai/catalog/standards/sist/73cb4d5d-f2e8-4dbf-bc8d-c6fa3b190427/iec-62295-2007)

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3.1.5 cluster address

one of the CCP addressing fields defined in the CCP layer which is used to distinguish multiple cluster networks linked to a single home server

NOTE A cluster address is shown in Figure 3.



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Figure 3 – Cluster and domain network

3.1.6

domain network

collection of devices connected to a single home server

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NOTE 1 Devices within the multiple cluster networks linked to the home server and the HSIs managing the cluster network interface constitute the domain network.

NOTE 2 A domain network is shown in Figure 3.

3.1.7

domain address

one of the CCP addressing fields defined in the CCP layer which is used to distinguish multiple domain networks in the home.

NOTE A domain address is shown in Figure 3.

3.1.8

single-HS network

a home network comprising a single home server where there is only one domain network under the single-HS network environment

3.1.9

multi-HS network

a home network with two or more home servers where there are multiple domain networks under the multi-HS network environment

NOTE A multi-HS network is shown in Figure 3.

3.1.10**CCP application program**

a CCP application program is positioned at the top of the CCP layer. A CCP application program sends and receives data to/from CCP layer through CCP application programming interface

3.1.11**application program data unit****APDU**

the unit of data exchanged among multiple application programs on an equivalent level

3.1.12**CCP application programming interface(API)**

the interface between the application program and the CCP layer

3.1.13**lower protocol layers**

lower protocol layers refer to all communication protocol layers below the CCP layer, with the exception of the physical layer

NOTE A diagram of lower protocol layers is shown in Figure 5.

3.1.14**lower protocol layers interface**

the interface between the APDU and lower protocol layers which are referred to as the lower protocol layers interface

NOTE A diagram of lower protocol layers interface is shown in Figure 5.

3.2 Abbreviations

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ACDS	Active Control & Data Service
ACMS	Active Control & Multimedia Service
ACS	Active Control Service
ALLSTAT	All Status
APDU	Application Program Data Unit
API	Application Program Interface
AT	Action Type
ATTR	Attribute
CCP	Common Communication Protocol
CCPADDRVER	CCP Address Version
CCPDEV	CCP Device
CCPH	CCP Header
CCPHDRVER	CCP Header Version
CCPID	CCP Identification
CCPLEN	CCP Payload Length
CMD	Command
CT	Cast Type
CTRLSTAT	Control Status
DATALEN	Data Length
DEV	Device
DMS	Data & Multimedia Service
DS	Data Service