

# INTERNATIONAL STANDARD



**Information technology – Home Electronic System (HES) interfaces –  
Part 4-1: Common user interface and cluster-to-cluster interface to support  
interworking among home cluster systems – Architecture**

[ISO/IEC 10192-4-1:2022](https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022)

<https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022>





**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2022 ISO/IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about ISO/IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

**About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

**IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

**IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)**

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

[ISO/IEC 10192-4-1:2022](https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022)

<https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022>

# INTERNATIONAL STANDARD



---

**Information technology – Home Electronic System (HES) interfaces –  
Part 4-1: Common user interface and cluster-to-cluster interface to support  
interworking among home cluster systems – Architecture**

[ISO/IEC 10192-4-1:2022](https://standards.iso.org/iso/iec/10192-4-1-2022)

<https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 35.200

ISBN 978-2-8322-1093-4

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions and abbreviated terms .....	7
3.1 Terms and definitions.....	7
3.2 Abbreviated terms.....	8
4 Conformance.....	8
5 Typical home cluster system.....	9
6 Cluster interworking.....	9
7 Common user interface.....	11
7.1 General.....	11
7.2 Alternative #1: common user interface in a cluster .....	12
7.3 Alternative #2: common user interface as a separate device .....	13
7.4 Alternative #3: common user interface in a service module .....	14
8 Operational system requirements .....	15
8.1 General.....	15
8.2 Other parts of ISO/IEC 10192-4 .....	16
Annex A (informative) Use case of common user interface in the HES gateway .....	17
A.1 Overview.....	17
A.2 Unified access to devices.....	17
A.3 Event binding among devices.....	18
Bibliography.....	20
Figure 1 – Core interoperability and HES standards.....	6
Figure 2 – HES gateway applications standards.....	6
Figure 3 – Typical home cluster system .....	9
Figure 4 – C2C enhanced home cluster system .....	10
Figure 5 – System layout for cluster interworking .....	11
Figure 6 – Common user interface in a cluster.....	12
Figure 7 – Common user interface as a separate device.....	13
Figure 8 – Common user interface in a service module.....	14
Figure 9 – C2C interworking application NSEE group.....	15
Figure A.1 – Unified access to devices distributed on multiple clusters .....	18
Figure A.2 – Event binding among devices distributed on multiple clusters .....	19

## INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) INTERFACES –

### Part 4-1: Common user interface and cluster-to-cluster interface to support interworking among home cluster systems – Architecture

#### FOREWORD

- 1) 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.
- 2) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO National bodies.
- 3) IEC and ISO documents have the form of recommendations for international use and are accepted by IEC and ISO National bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC and ISO documents is accurate, IEC and ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC and ISO National bodies undertake to apply IEC and ISO documents transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC and ISO document and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC and ISO do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC and ISO marks of conformity. IEC and ISO are not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this document.
- 7) No liability shall attach to IEC and ISO or their directors, employees, servants or agents including individual experts and members of its technical committees and IEC and ISO National bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this ISO/IEC document or any other IEC and ISO documents.
- 8) Attention is drawn to the Normative references cited in this document. Use of the referenced publications is indispensable for the correct application of this document.
- 9) Attention is drawn to the possibility that some of the elements of this ISO/IEC document may be the subject of patent rights. IEC and ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 10192-4-1 has been prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
JTC1-SC25/2990/CDV	JTC1-SC25/3032/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs) and [www.iso.org/directives](http://www.iso.org/directives).

A list of all parts in the ISO/IEC 10192 series, published under the general title *Information technology – Home Electronic System (HES) interfaces*, can be found on the IEC website.

**IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC 10192-4-1:2022](https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022)

<https://standards.iteh.ai/catalog/standards/sist/8bf86cd5-d504-4361-a5fb-c8219ef76851/iso-iec-10192-4-1-2022>

## INTRODUCTION

A home cluster system is implemented by interconnecting several devices to deliver one or more applications. A cluster can function independently of other clusters. Cluster devices include sensors, actuators, a controller, and user interfaces. Multiple home cluster systems can be installed and operated in a single home for the following reasons.

- There are various types of application domains in the home such as lighting, safety, air conditioning, telecommunications, and audio/video, etc. One or more applications are implemented by the constituents of a cluster. If a user purchases several applications, multiple home cluster systems can be installed in a home.
- Home application vendors usually provide systems implemented in clusters of required devices. Depending on the user's needs, several application systems, possibly from different manufacturers, can be installed in a home as separate clusters.

A customer can access a device in a cluster via a user interface provided for that cluster. With multiple clusters a user needs to learn how to operate a range of different interfaces. This document provides the cluster-to-cluster interworking foundation necessary for a single common user interface to manage applications in multiple clusters.

Application-to-application and the resulting device-to-device collaboration are essential for providing integrated services in a multi-device HES environment. For example, if a fire monitoring system detects a fire, the indoor lights should be turned on and the fire announcements should be broadcast through available speakers in the house for prompt evacuation of the residents, the ventilation blowers should be stopped to avoid spreading the fire, and the public fire service should be contacted. This needs collaboration among fire detectors, indoor lights, speakers, HVAC and telecommunication devices. If the devices are located in different clusters, cluster-to-cluster interworking is needed for collaboration among them.

ISO/IEC 10192-4-1:2022

In practice, a safety monitoring cluster might send out a fire-detected message and a lighting cluster might be ready to activate a lighting scene that alerts the occupant by turning on or flashing the appropriate lights. However, the two clusters might not have a way to communicate with each other especially if supplied by different manufacturers possibly using different protocols and messages. This document solves that problem by providing the necessary interworking and interoperability functionality to ensure that the clusters can work together.

When the cluster systems are in different HANs or use different protocols, the interworking is accomplished using the HES gateway (ISO/IEC 15045 series) and related interoperability standards (ISO/IEC 18012 series). Additional standards needed for implementation of this document are under development. For interworking between cluster systems using the same protocols and belonging to the same HAN, HES gateway services may optionally be used if the cybersecurity, privacy and safety features of the HES gateway are desired. This document does not require the Internet to operate, but can connect to the Internet if the application requires.

This document specifies the architecture for interworking home cluster systems where

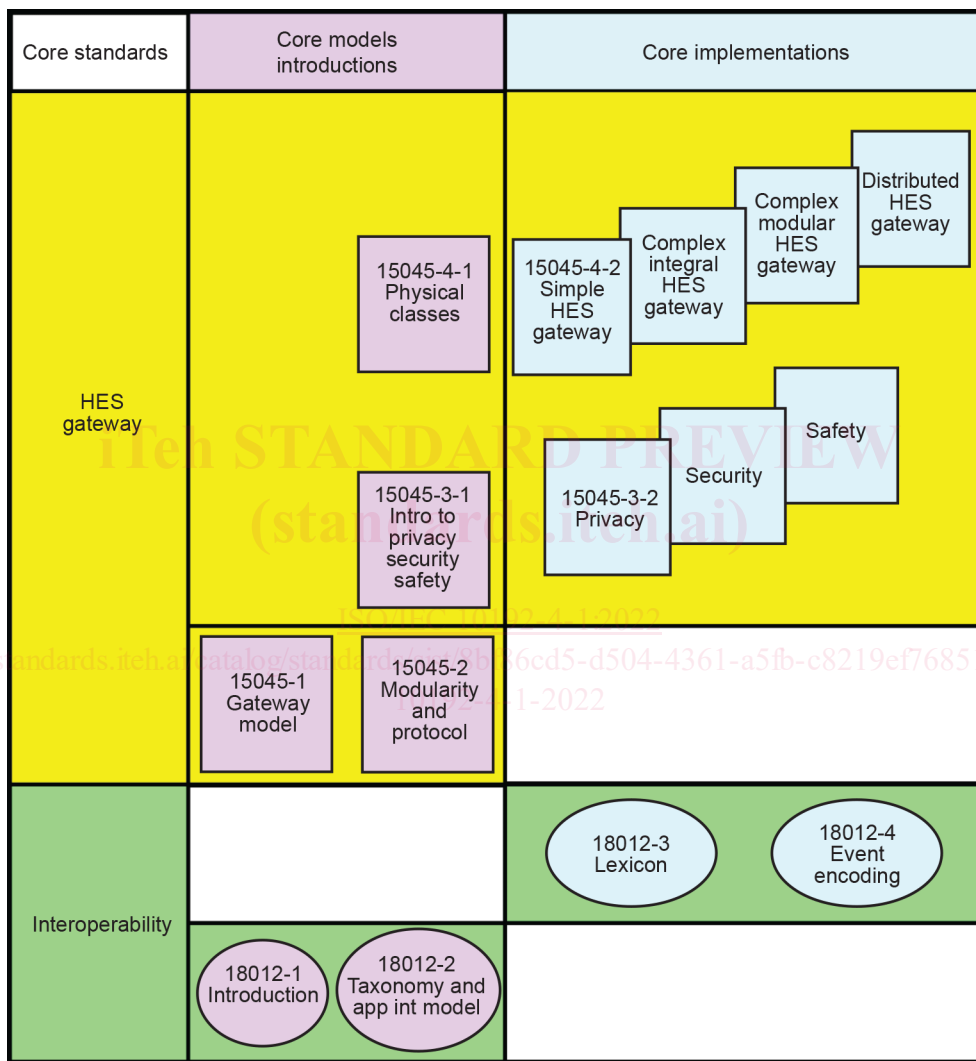
- the home cluster systems use different HANs or protocols, or
- the home cluster systems use the same HANs and protocols plus the services of the HES gateway.

Figure 1 shows the core interoperability and HES gateway standards. Figure 2 shows the common user interface series of standards designated ISO/IEC 10192-4, *Information technology – Home Electronic System (HES) interfaces – Common user interface and cluster-to-cluster interface to support interworking among home cluster systems*. ISO/IEC 10192-4 consists of three parts:

Part 4-1: Architecture

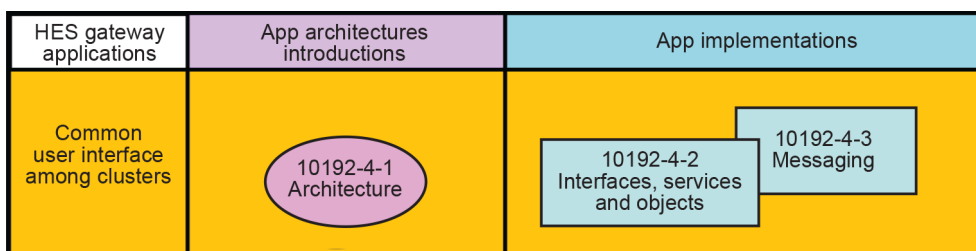
Part 4-2: Interfaces, services and objects

Part 4-3: Messaging



IEC

**Figure 1 – Core interoperability and HES standards**



IEC

**Figure 2 – HES gateway applications standards**



# INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) INTERFACES –

## Part 4-1: Common user interface and cluster-to-cluster interface to support interworking among home cluster systems – Architecture

### 1 Scope

This part of ISO/IEC 10192 specifies an architecture for a common user interface and cluster-to-cluster interface to support interworking among home cluster systems. It specifies a cluster-to-cluster interface to enable interworking among home cluster systems and interoperability among the applications supported by these cluster systems as well as a common user interface to these cluster-system applications. This common user interface provides input and output methods for user information exchange to access, monitor and control applications running on home cluster systems.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15045 (all parts), *Information technology – Home Electronic System (HES) gateway*

ISO/IEC 18012 (all parts), *Information technology – Home Electronic System (HES) – Guidelines for product interoperability*

### 3 Terms, definitions and abbreviated terms

#### 3.1 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>

##### 3.1.1

##### **C2C interface**

interface in a cluster that supports HAN communication for C2C interworking with an HES gateway by a cluster controller in a home cluster system

##### 3.1.2

##### **CUI user object**

local user object and service that enable users to access, monitor, and control applications running on their home cluster system and to schedule coordination among them

### 3.1.3

#### **home cluster system**

set of functional units under common control in a home environment that includes sensors, actuators, user interfaces, and a cluster controller

### 3.1.4

#### **master CUI C2C interface**

C2C interface of a home cluster system that includes CUI user objects that initiate actions on remote systems

### 3.1.5

#### **NSEE group**

group of HAN and WAN network interface modules, service modules and HES-CLME event encoding to support a particular application or operation

### 3.1.6

#### **receptive CUI C2C interface**

C2C interface of a home cluster system that manipulates the local cluster based upon receipt of CUI user objects from a remote master CUI

### 3.1.7

#### **user interface**

functional system used specifically to interface the computer-based control system to the operator, maintenance personnel, or engineer

[SOURCE: IEC 62270:2013]

## 3.2 Abbreviated terms

C2C	cluster to cluster
CLME	common language messaging exchange
CUI	common user interface
HAN	home area network
HES	home electronic system
HVAC	heating, ventilation, and air conditioning
NSEE	network (e.g. HAN and WAN network modules), service (e.g. service modules), and event encoding (e.g. HES-CLME)
WAN	wide area network

## 4 Conformance

Home cluster systems that claim conformance to this document shall:

- support the configuration as specified in Clause 5;
- support the C2C interface as specified in Clause 6.

An HES gateway that claims conformance to this document shall include service modules and features that:

- support the cluster interworking as specified in Clause 6;
- support the common user interface as specified in Clause 7;
- support the C2C interworking application NSEE group as specified in Clause 8.

## 5 Typical home cluster system

A typical home cluster system is composed of a cluster controller, zero, one or more local sensors, local actuators and local user interfaces, see Figure 3.

A typical home cluster system in this document is an independent cluster that shall have

- one cluster controller in charge of managing local devices in the cluster, and
- zero or more local user interfaces for accessing the cluster functions, and
- at least one or more local sensors and/or actuators.

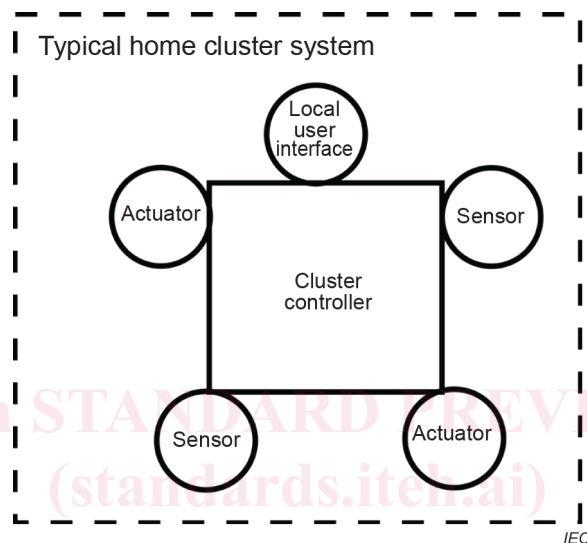


Figure 3 – Typical home cluster system

## 6 Cluster interworking

To support multi-cluster operation, a typical home cluster system is enhanced with an additional C2C interface to become a C2C enhanced home cluster system. The C2C interface communicates to a cluster controller in a home cluster system via a home area network (HAN), as shown in Figure 4. A cluster can have a remote access interface for external access, which can be used as the C2C interface. Each cluster is designed for a particular transmission medium with a specific communication protocol for the C2C interface. Therefore, the characteristics of the C2C interface can be different for each cluster.