



ISO/IEC 10192-4-2

Edition 1.0 2024-09

INTERNATIONAL STANDARD



**Information technology – Home Electronic System (HES) interfaces –
Part 4-2: Common user interface and cluster-to-cluster interface to support
interworking among home cluster systems – Interfaces, services and objects**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.200

ISBN 978-2-8322-9665-3

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

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	8
2 Normative references	8
3 Terms, definitions, and abbreviated terms	9
3.1 Terms and definitions.....	9
3.2 Abbreviated terms.....	10
4 Conformance.....	11
5 HES components for common user interface	11
6 Common user interface.....	13
7 CUI operational information	13
7.1 Usage	13
7.2 CUI operational information composition.....	15
7.3 Delivery of CUI operational information.....	15
7.4 Interoperability of heterogeneous CUI operational information	16
7.5 CUI selection and resultant actions for handling devices.....	16
7.5.1 General	16
7.5.2 Acquisition of user's set of devices	17
7.5.3 Synchronization of user devices	17
7.5.4 Handling of request and response for user devices.....	17
8 Secure C2C connection	17
9 C2C authorization.....	18
9.1 General.....	18
9.2 User identity federation.....	18
9.3 C2C authorization procedure	21
10 C2C interface	22
11 CUI service.....	22
12 C2C interworking application ISEE group	22
12.1 General.....	22
12.2 C2C authorization controller service.....	23
12.3 C2C authorization processor service.....	23
12.4 C2C controller service.....	23
12.5 C2C processor service.....	24
12.6 Other services	24
12.7 HAN interface module	25
13 Privacy, security, and safety considerations	25
Bibliography.....	26
Figure 1 – Core interoperability and HES standards.....	7
Figure 2 – HES gateway applications standards.....	7
Figure 3 – CUI components of alternative #1: common user interface in a cluster	12
Figure 4 – CUI components of alternative #2: common user interface as a separate device.....	12
Figure 5 – CUI components of alternative #3: common user interface in a service module.....	12

Figure 6 – Translation between CUI operational information and interactive media	13
Figure 7 – Interactive visual and touch media	14
Figure 8 – Interactive speaker and voice media	14
Figure 9 – Interoperability of heterogenous CUI systems	16
Figure 10 – TLS based C2C secure connection	18
Figure 11 – Configuration of user identities and devices	19
Figure 12 – Configuration of user identity federation table	21
Figure 13 – C2C authorization procedure	22
Figure 14 – Structure of C2C interworking application ISEE group	23
Figure 15 – Address referencing of binding map service to a device in a cluster	24
Table 1 – Correlation between roles in OAuth 2.0 and CUI components	21

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) INTERFACES –

Part 4-2: Common user interface and cluster-to-cluster interface to support interworking among home cluster systems – Interfaces, services and objects

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) IEC and ISO draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC and ISO take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC and ISO had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch> and www.iso.org/patents. IEC and ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 10192-4-2 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-SC25/3221/CDV	JTC1-SC25/3263/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, and the ISO/IEC Directives, JTC 1 Supplement available at www.iec.ch/members_experts/refdocs and 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.

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, audio and video, etc. One or more applications are implemented by the constituents of a cluster. Therefore, if a user purchases several applications, they will be implemented by one or more home cluster systems.
- 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 the functions provided by a cluster via a user interface associated with that cluster. With multiple clusters it is important for a user 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 Home Electronic System (HES) environment. For example, if a fire monitoring system detects a fire, it is important that the indoor lights are turned on and the fire announcement is broadcast through available speakers in the house for prompt evacuation of the residents, the ventilation blowers are stopped to avoid spreading the fire, and the public fire service is 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 essential for collaboration among them.

In practice, a safety monitoring cluster can send out a fire-detected message and a lighting cluster can be ready to activate a lighting scene that alerts the occupant by turning on or flashing the appropriate lights. However, these two clusters usually do 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, interworking is accomplished using the HES gateway (ISO/IEC 15045 series) and related interoperability standards (ISO/IEC 18012 series). For interworking between cluster systems using the same protocols and belonging to the same HAN, HES gateway services can optionally be used if the cybersecurity, privacy and safety features of the HES gateway are desired. The functions specified in this document do 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

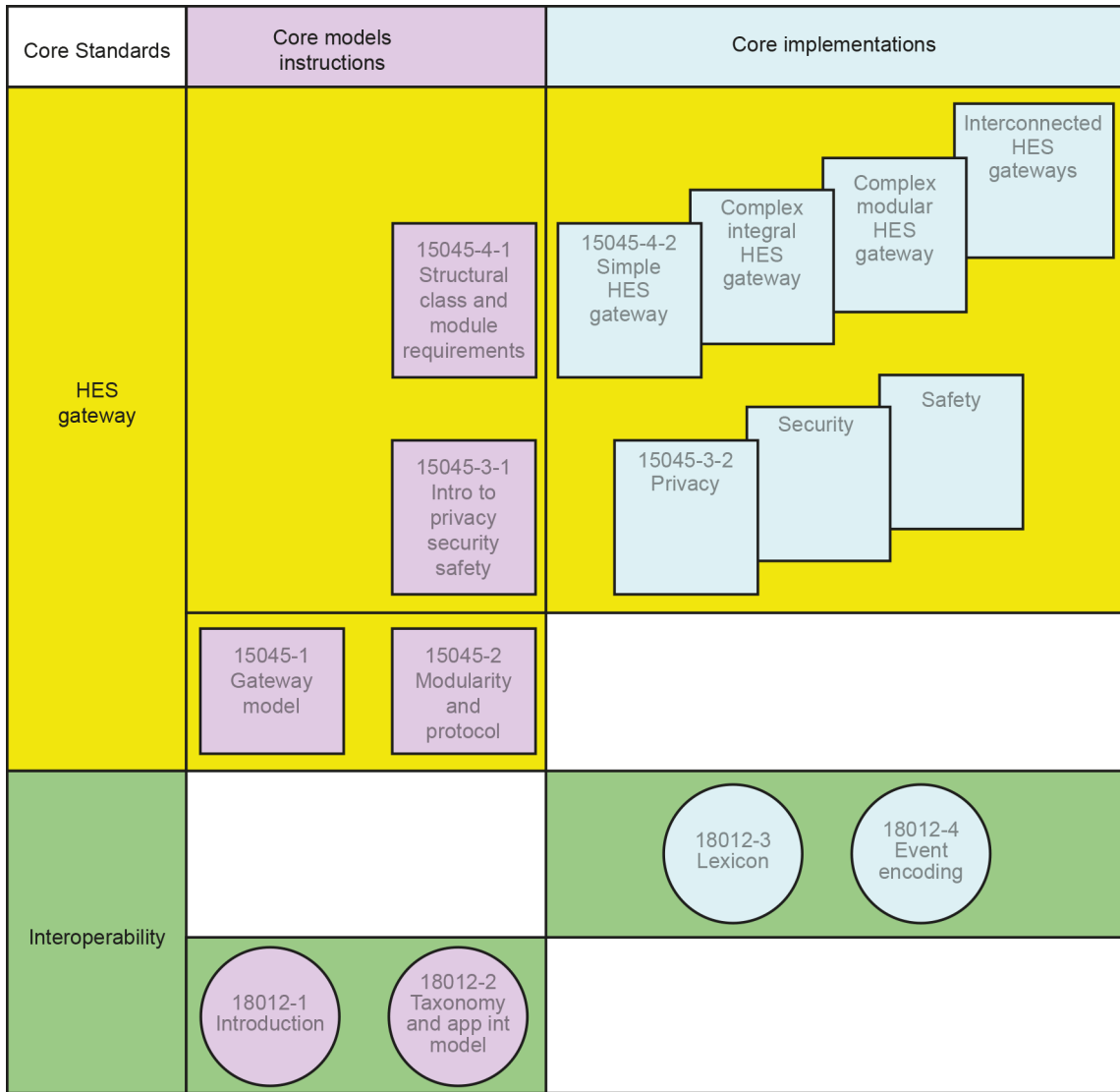
- the home cluster systems use different HANs or protocols, or
- the home cluster systems use the same HANs and protocols plus the services of the HES gateway.

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

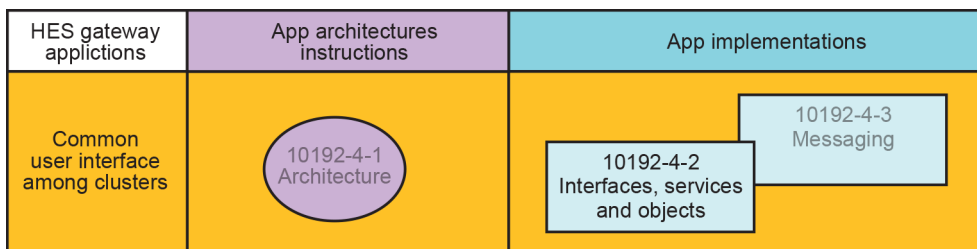
Part 4-2: Interfaces, services and objects

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 4-2: Common user interface and cluster-to-cluster interface to support interworking among home cluster systems – Interfaces, services and objects

1 Scope

This part of ISO/IEC 10192 specifies a control architecture, user interface, and service objects in the HES gateway to enable interworking among home cluster systems and interoperability among the applications supported by these cluster systems. The ISO/IEC 10192 series specifies 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, control and coordinate applications running on home cluster systems.

This document specifies the application object, service and interface modules from the interoperability standard (ISO/IEC 18012 series) necessary for interworking and incorporation of these modules in the HES gateway (ISO/IEC 15045 series).

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 10192-4-1, *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 15045-1, *Information technology – Home Electronic System (HES) gateway – Part 1: A residential gateway model for HES*

ISO/IEC 15045-2, *Information technology – Home Electronic System (HES) gateway – Part 2: Modularity and protocol*

ISO/IEC 15045-3-1, *Information technology – Home Electronic System (HES) gateway – Part 3-1: Privacy, security, and safety – Introduction*

ISO/IEC 15045-3-2, *Information technology – Home Electronic System (HES) gateway – Part 3-2: Privacy, security, and safety – Privacy framework*

ISO/IEC 15045-4-1, *Information technology – Home Electronic System (HES) gateway – Part 4-1: Structure – Structural class and module requirements*

ISO/IEC 15045-4-2, *Information technology – Home Electronic System (HES) gateway – Part 4-2: Structure – Simple gateway*

ISO/IEC 18012-1, *Information technology – Home Electronic System (HES) – Guidelines for product interoperability – Part 1: Introduction*

ISO/IEC 18012-2, *Information technology – Home Electronic System (HES) – Guidelines for product interoperability – Part 2: Taxonomy and application interoperability model*

ISO/IEC 18012-3, *Information technology – Home Electronic System (HES) – Guidelines for product interoperability – Part 3: Lexicon*¹

ISO/IEC 18012-4, *Information technology – Home Electronic System (HES) – Guidelines for product interoperability – Part 4: Event encoding*²

¹ First edition under preparation. Stage at the time of publication: ISO/IEC CDV 18012-3:2024.

² First edition under preparation. Stage at the time of publication: ISO/IEC CDV 18012-4:2024.