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IEC Secretariat
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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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 4-1: Structure – Structural class and module requirements

FOREWORD

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ISO/IEC 15045-4-1 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-SC25/3191/CDV	JTC1-SC25/3258/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 15045 series, published under the general title *Information technology – Home Electronic System (HES) gateway*, can be found on the IEC and ISO websites.

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INTRODUCTION

0.1 Overview

The Home Electronic System (HES) is a set of standards that supports communication, control, and monitoring applications for homes and buildings. However, homes and buildings present a heterogeneous and evolving networked environment, where many of these networks and applications (including some that are based on HES standards) are not directly interoperable with each other. HES standards achieve interoperability through the ISO/IEC 15045 series that relies on the ISO/IEC 18012 series to support functional interworking among the dissimilar home devices, applications, protocols, and networks found in this environment. The ISO/IEC 15045 series and ISO/IEC 18012 series were created to render all protocols interoperable.

The HES gateway enables an open and adaptable market for incompatible products by specifying a standardized modular system intended to provide interoperability among the diversity of networks found in homes and buildings. The HES interoperability process does not require modification of the various networks, applications, or protocols that use it. Appropriate interworking functions translate network messages through interface modules to a common lexicon expression that is then exchanged using a private internal network bus protocol. A protected application platform using a bus protocol supports an expanding array of services for both the applications and the network.

In summary, the ISO/IEC 15045 series specifies a standardized modular dedicated private internal network system that includes:

– interfaces (i.e. interface modules) for communication and semantic translation among dissimilar home area networks (HANs), and between a HAN and external wide area networks (WANs),

– a platform for supporting a variety of application services (i.e. service modules), and

– a secure communication path among these modular elements with access restricted to the appropriate elements in order to protect data, safety and privacy.

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The purpose of this document is to define the structural classes of gateway modularity and to aid manufacturers in implementing consistent and interoperable HES gateway systems and HES gateway modules. Although the HES gateway system is based on the concept of logical modularity, this document allows distinct configuration choices for the implementation of gateway physical modularity and the corresponding internal communication pathways. These configurations include the following four classes (abbreviated names are in parentheses):

a) Class 1: Simple gateway configuration ("Simple")

   Manages and controls the communications between two HANs or one HAN and one WAN within one housing.

b) Class 2: Complex integral gateway configuration ("Complex integral")

   Manages and controls the communications among three or more HANs and WANs within one housing.

c) Class 3: Complex modular gateway system configuration ("Complex modular")

   Manages and controls the communications via a private internet event bus among interoperable modular components that are provided by multiple manufacturers enabling an unlimited expandability.

d) Class 4: Interconnected gateway system configuration ("Interconnected")

   Manages and controls the communications between more than one HES gateway system so that they operate equivalently to a single HES gateway system.

The primary differences among these four gateway classes are the degree of physical modularity or degree of integration (i.e. packaging) and the method of communications among the modular elements.

0.2 Relation to existing work

The HES gateway class configurations are introduced and briefly described in ISO/IEC 15045-1. In the case of physically separated HES gateway modules (i.e. complex modular gateway systems), communication among modular elements is provided by a dedicated private internet serial bus (i.e. Ethernet) as discussed in ISO/IEC 15045-2. The message content (protocol data unit, PDU) and set of standardized protocols and objects are specified in ISO/IEC 18012-3 and are known as home electronic system common language message exchange (HES-CLME). For serial communications between physical modular products, the home electronic system common language internal protocol (HES-CLIP) is used. For simple and integral gateway configurations, message communication is accomplished by the home electronic system common language direct PDU exchange (HES-CLDPE). In both cases, the same lexicon and event encoding are used.

Figure 1 shows the core interoperability and HES gateway series of standards and where this document fits into the HES gateway series.

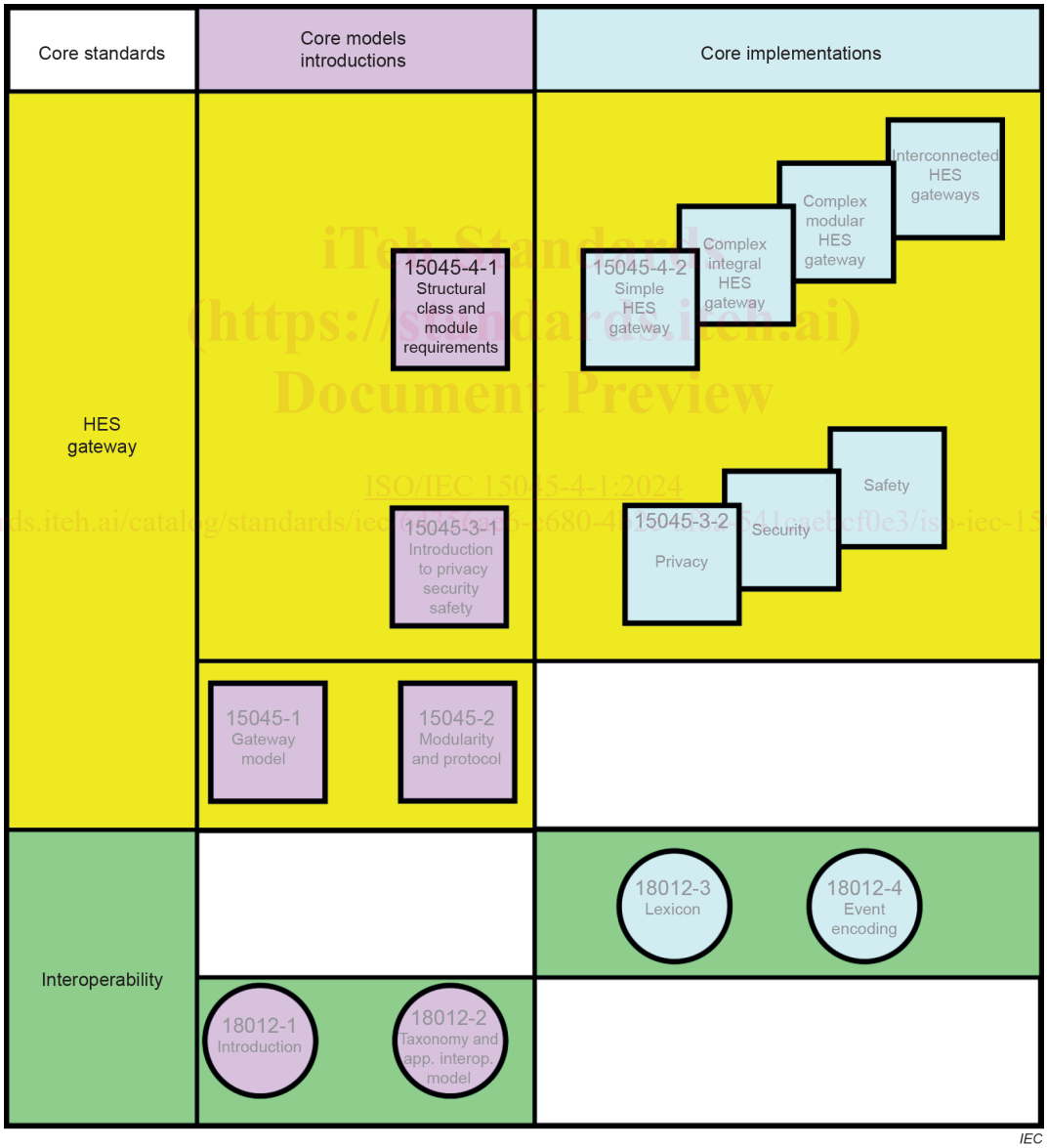

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Figure 1 – ISO/IEC 15045-4-1 within the core interoperability and HES gateway standards

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 4-1: Structure – Structural class and module requirements

1 Scope

This document specifies a set of physical classes for the HES gateway system. It also specifies the requirements of HES gateway modules including home area network interface modules, wide area network interface modules, binding map service and service modules for any class chosen.

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 15045-1, *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 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]

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[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.