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INTERNATIONAL STANDARD

colour inside

Information technology – Home Electronic System (HES) gateway – Part 4-2: Structure – Simple gateway

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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 4-2: Structure – Simple gateway

FOREWORD

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ISO/IEC 15045-4-2 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-SC25/3192/CDV	JTC1-SC25/3259/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.

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

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 (service modules), and
– a secure communication path among these modules with access restricted to the appropriate modules in order to protect data, safety and privacy.

0.2 Relation to existing work

The ISO/IEC 15045 series provides four classes representing alternative configurations for the implementation of HES gateway physical modularity and an internal communications path:

a) simple;
b) complex-integral;
c) complex-modular;
d) interconnected.

0.3 Simple gateway

The purpose of this document is to specify requirements for the simple HES gateway that manages and controls the communications between two networks, either two HANs or one HAN and one WAN.

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

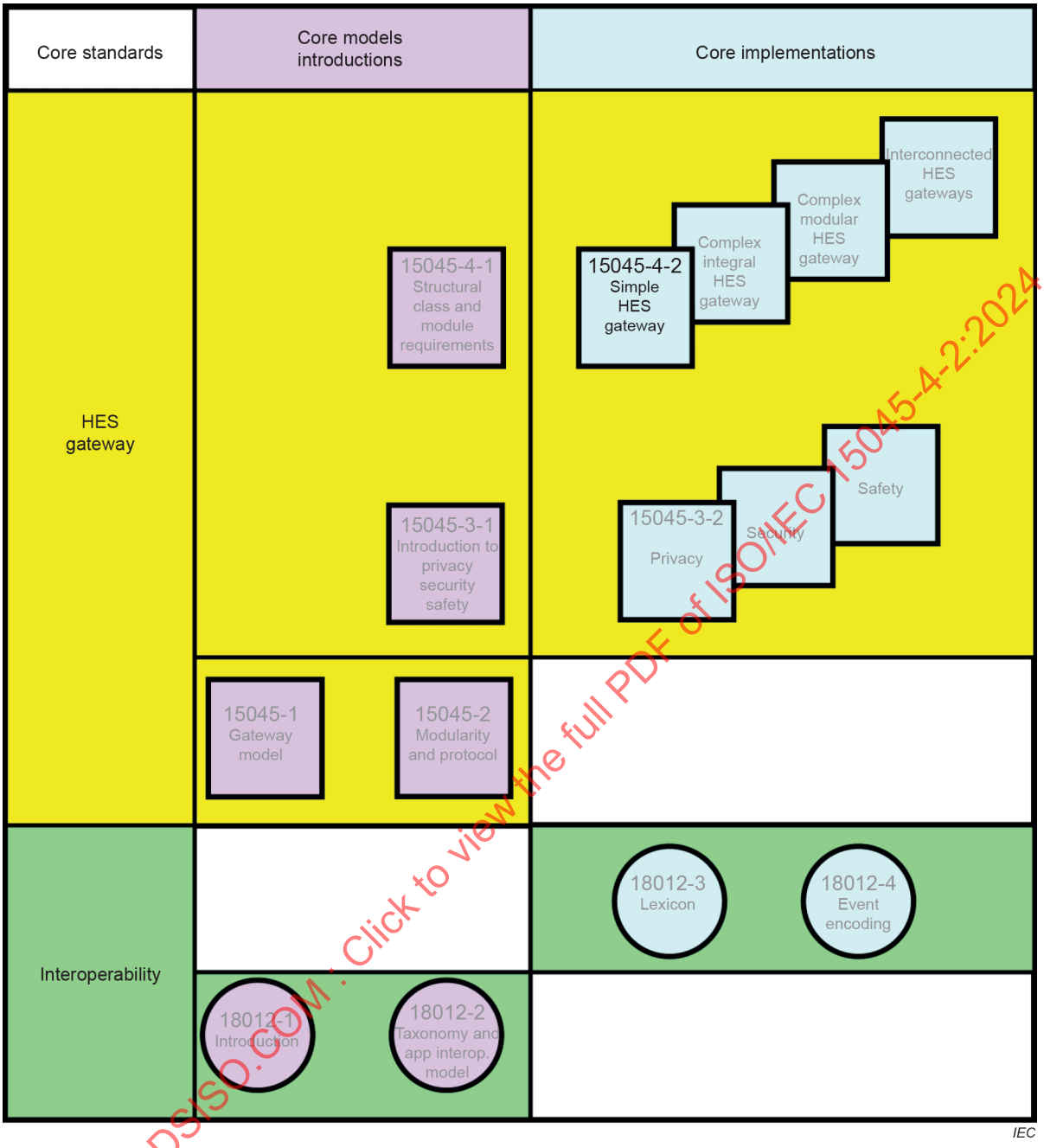


Figure 1 – ISO/IEC 15045-4-2 within the core interoperability and HES gateway standards

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 4-2: Structure – Simple gateway

1 Scope

This document specifies the simple HES gateway, which is one of a set of physical classes introduced in ISO/IEC 15045-1:2004.

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 15045-4-1:2024, *Information technology – Home Electronic System (HES) gateway – Part 4-1: Structure – Structural class and module requirements*

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 terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
HAN interface logical module
HES gateway module that interfaces between a HAN and an event bus carrying HES-CLDPE messages

3.1.2
home area network
HAN
network serving nodes, devices, components and functions within a premises protected area

[SOURCE: ISO/IEC 15045-3-1:2024, 3.1.1]

3.1.3
logical module
HES gateway module that interfaces to an event bus carrying HES-CLDPE messages

3.1.4
protocol data unit
PDU
unit of data exchanged between peer entities

3.1.5
WAN interface logical module
HES gateway module that interfaces between a WAN and an event bus carrying HES-CLDPE messages

3.1.6
wide area network
WAN
network that connects communication devices in the environment external to the premises protected area

[SOURCE: ISO/IEC 15045-3-1:2024, 3.1.12]

3.2 Abbreviated terms

HAN	home area network
HES-CLIP	home electronic system common language internal protocol
HES-CLDPE	home electronic system common language direct protocol data unit exchange
HES-CLME	home electronic system common language message exchange
ID	identification
PDU	protocol data unit
WAN	wide area network

4 Conformance

An HES gateway system conforming to this document shall implement one of the two simple gateway alternative configurations in 5.2.

5 Simple HES gateway family

5.1 Simple HES gateway

The HES gateway system allows home area networks (HANs) supporting local users, devices and services, and external wide area networks (WANs) supporting remote users, devices and services to communicate, translate, and achieve interoperability among these networks. The HES gateway system provides privacy and security and supports a platform for application services.

The configuration specified within this document, the simple HES gateway, manages and controls communications between two networks, either two HANs (as shown in Figure 2) or one WAN and one HAN (as shown in Figure 3), and is packaged as a standalone module in one housing. This configuration of the HES gateway is a minimum complexity implementation and is non-expandable (i.e. it cannot be expanded to additional network interfaces). It is likely dedicated to a single application while delivering the basic HES gateway services of interoperability, privacy, security and safety. It preserves the HES gateway modular internal structure and home electronic system common language message exchange (HES-CLME) mechanisms by employing home electronic system common language direct protocol data unit (PDU) exchange (HES-CLDPE) to reduce complexity, rather than the serial event bus using home electronic system common language internal protocol (HES-CLIP).

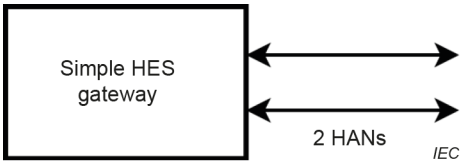


Figure 2 – Two HANs

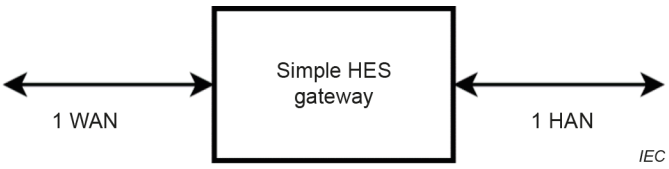


Figure 3 – One WAN and one HAN

Internal PDU communication links, called HES-CLDPE, are used between logical modules for communications between the two networks as shown in Figure 4 and Figure 5. The HES-CLDPE links are implemented by manufacturers to fit their needs and can be wiring connections, traces on a circuit board, or internal to chips.

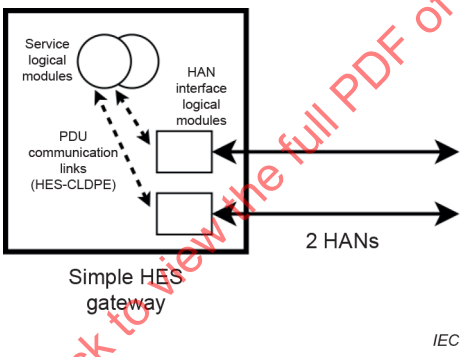


Figure 4 – Logical modules for two HANs

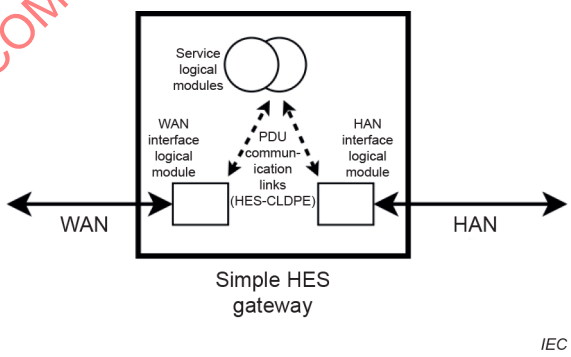


Figure 5 – Logical modules for one WAN and one HAN

5.2 Simple HES gateway alternative configurations

5.2.1 General

An implementation of the simple HES gateway shall be configured using one of the alternatives specified:

– HAN-to-HAN (basic translator service) in 5.2.2;

– WAN-to-HAN (basic support service) in 5.2.3.

NOTE There are initially two alternative configurations for simple HES gateways. It is possible that additional simple HES gateway configurations will be developed and specified in revised documents.

5.2.2 Simple HES gateway: HAN-to-HAN (basic translator service)

The simple HES gateway, HAN-to-HAN (basic translator service), provides the translator functionality between two HAN networks.

This gateway system incorporates a binding map service to communicate between each network logical module as shown in Figure 6. For conformance with the ISO/IEC 15045 series, communications between the network logical modules on different HANs (including HANs with different segments or with different privileges) shall be via the HES gateway system.

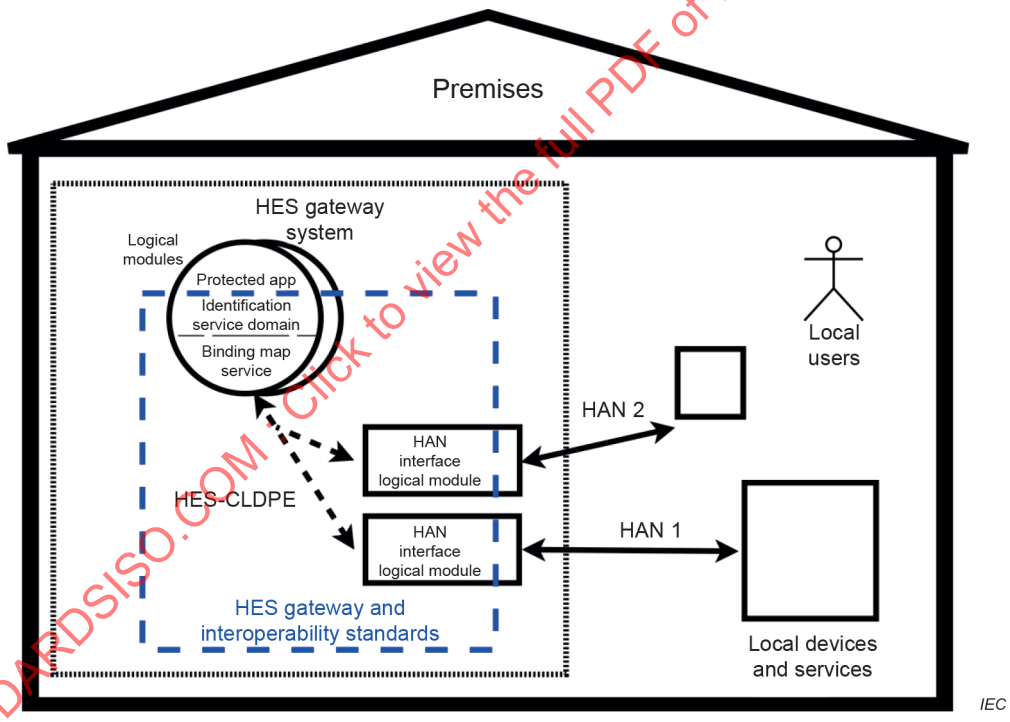


Figure 6 – Simple HES gateway with two HANs (basic translator service)

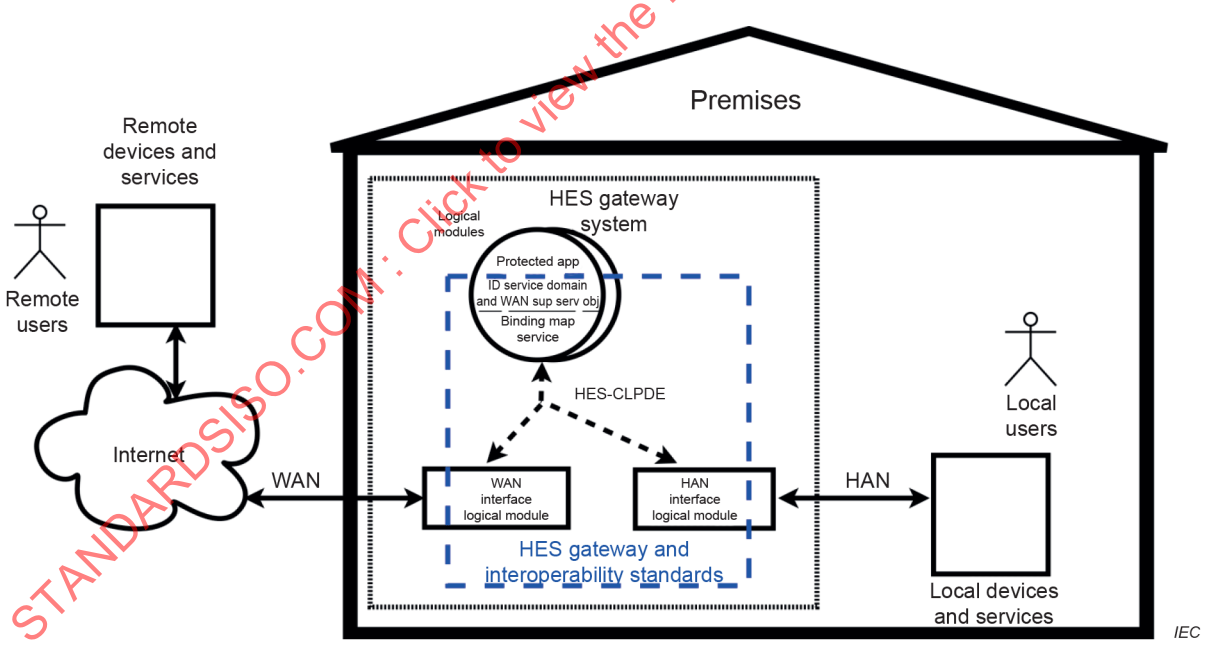
This HES gateway system shall:

– include exactly two HAN interface logical modules as specified in ISO/IEC 15045-4-1:2024, 5.2.4;
– include binding map services (as appropriate for services provided) as specified in ISO/IEC 15045-4-1:2024, 5.2.6;
– include one and only one identification service domain as specified in ISO/IEC 15045-4-1:2024, 5.2.8;
– include optional other services as needed, as specified in ISO/IEC 15045-4-1:2024, 5.2.7;
– meet the HES gateway system baseline requirements of ISO/IEC 15045-4-1:2024, 5.2.2; and
– be packaged in one housing as a standalone module.

5.2.3 Simple HES gateway: WAN-to-HAN (basic support service)

The simple HES gateway, WAN-to-HAN (basic support service), provides the translator functionality between one WAN network and one HAN network, and other basic services (such as authorization, ID, etc.) that are required to support the WAN network connection to beyond the premises.

This gateway system incorporates a binding map to communicate between the WAN interface logical module and the HAN interface logical module as shown in Figure 7. Direct communications (either over the HES-CLDPE or external to the HES gateway system) between the WAN and HAN logical modules are not allowed. This gateway system also includes support for the WAN through WAN support service objects.



Key

sup serv obj support service object

Figure 7 – Simple HES gateway with one WAN and one HAN (basic support service)

This HES gateway system shall:

– include one and only one HAN interface logical module as specified in ISO/IEC 15045-4-1:2024, 5.2.4;

– include one and only one WAN interface logical module as specified in ISO/IEC 15045-4-1:2024, 5.2.5;

– include binding map services (as appropriate for services provided) as specified in ISO/IEC 15045-4-1:2024, 5.2.6;

– include one and only one identification service domain as specified in ISO/IEC 15045-4-1:2024, 5.2.8;

– include appropriate "WAN support" service objects to support the WAN, as specified in ISO/IEC 15045-4-1:2024, 5.2.7;

– include optional other service objects as needed, as specified in ISO/IEC 15045-4-1:2024, 5.2.7;

– meet the HES gateway system baseline requirements of ISO/IEC 15045-4-1:2024, 5.2.2; and

– be packaged in one housing as a standalone module.