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INTERNATIONAL STANDARD

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

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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 3-1: Privacy, security, and safety – Introduction

FOREWORD

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ISO/IEC 15045-3-1 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-SC25/3189/CDV	JTC1-SC25/3260/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.

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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 communications, 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, which 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 application 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.

0.2 Relation to existing work

ISO/IEC 15045-1 identifies a range of threats relating to privacy, security, and safety in general terms. ISO/IEC 15045-2 specifies the underlying architecture for the HES gateway. However, neither part provides specific privacy, security and safety requirements for HES gateway conformance. ISO/IEC 15045-3-1 (this document) introduces the privacy, security, and safety standards and requirements that are applicable to the HES gateway in order to protect the interest of consumers within the home and small office environments. This document also describes the inter-relationships among the overlapping topics of privacy, security, and safety.

This document anticipates and introduces the series of additional Part 3 subparts dealing with specific aspects of privacy (ISO/IEC 15045-3-2), security (ISO/IEC 15045-3-3), and safety (ISO/IEC 15045-3-4).

The purpose of the ISO/IEC 15045-3 series requirements is to specify methods for protecting home and building systems from both internal and external threats, intrusions, or unintended observation of data and unsafe conditions that can result from network functions. The ISO/IEC 15045-3 series specifies a set of basic and advanced requirements for gateway monitoring and control of both inbound and outbound traffic, including switching, routing, addressing, encryption, intrusion detection and prevention, and other "firewall" functions.

The ISO/IEC 15045-3 series requirements specify the following functions:

a) prevention of active inbound attacks and unsafe commands;
b) discovery and classification of outbound traffic;
c) management of privacy and security mechanisms;

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d) blocking unauthorized HAN and WAN services and devices from communicating with internal networks and with each other;

e) enabling and managing authorized HAN and WAN services and devices including certification and other similar processes;

f) provision for a management and reporting dashboard for use by a non-technical end-user.

Devices or other entities communicating with each other but not on the same HAN use the HES gateway.

0.3 Relevant affected stakeholder categories

Manufacturers and vendors of smart home devices and other electrical or electronic products and appliances in the home and building systems market will be able to make and offer interoperable products with the benefit of a private, secure, and safe HES environment. Conformity with HES gateway interoperability, privacy, security, and safety requirements can create significant market synergy, expand the available range of applications, and serve the interests of consumers, manufacturers, vendors, and society as a whole. Specifically, this document, together with other parts in the ISO/IEC 15045-3 series, will ensure the privacy, security, and safety of personal and premises information in the emerging economy of devices connected to online services.

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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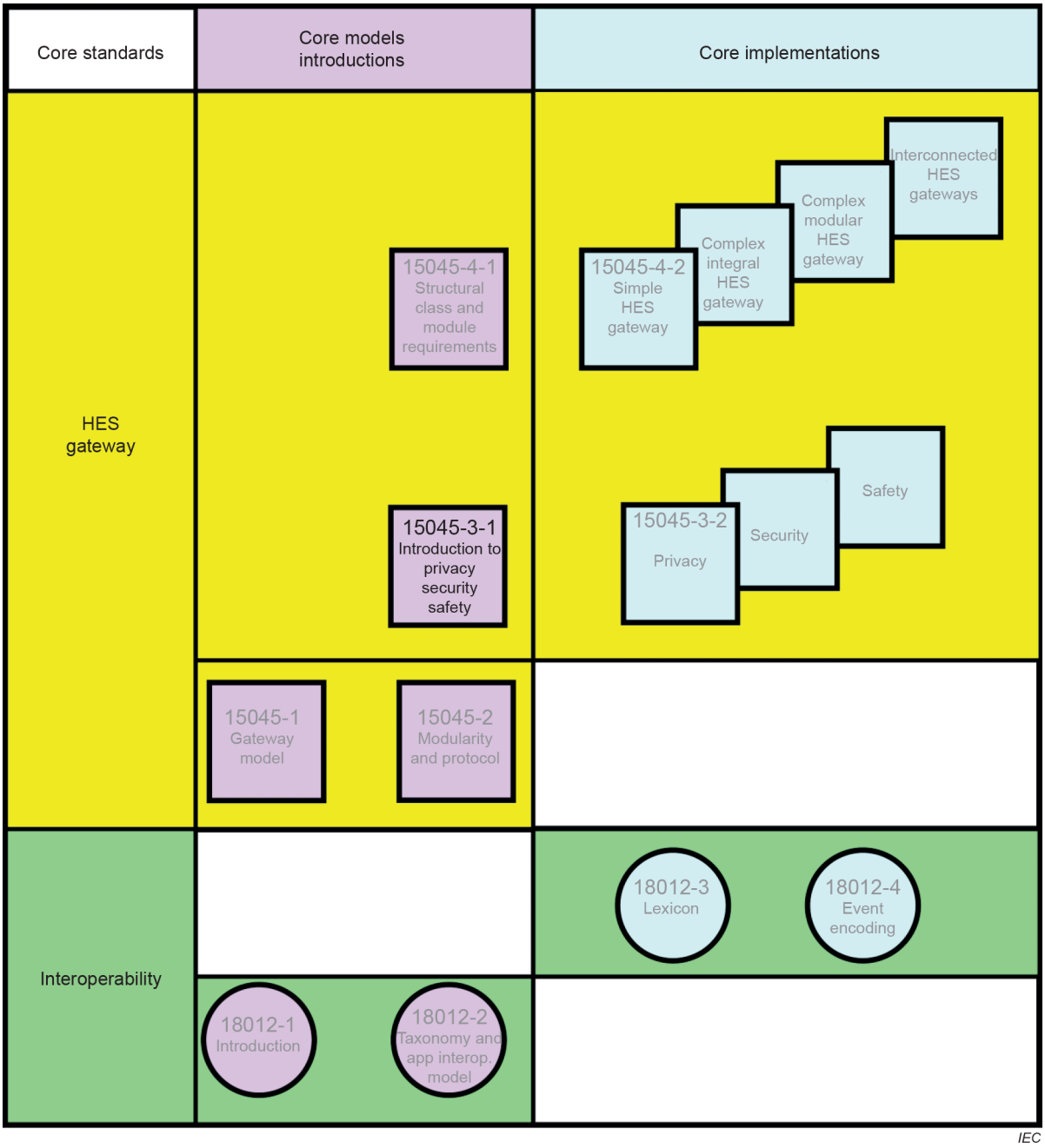

Figure 1 – ISO/IEC 15045-3-1 within the core interoperability and HES gateway standards

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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 3-1: Privacy, security, and safety – Introduction

1 Scope

This document specifies the architectures for the HES gateway related to protection of privacy, security and safety of communications between different networks. It also offers guidelines for HES gateway implementations, interfaces, and application services regarding privacy, security and safety. Such HES gateway guidelines include suggested approaches, choices, or recommended practices. Further, it identifies some areas of vulnerability to be addressed and offers relevant categories or use cases.

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 15944-8:2012, *Information technology – Business Operational View – Identification of privacy protection requirements as external constraints on business transactions*

ISO/IEC 29100, *Information technology – Security techniques – Privacy framework*

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

3.1.2
home electronic system
HES
control and sensing system for homes and buildings based on home electronic system (HES) ISO/IEC standards

Note 1 to entry: The referenced ISO/IEC standards normally include HES in the title of each standard.

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3.1.3
HES gateway
electronic device that transfers messages among WANs and HANs providing interoperability, privacy, security and safety in accordance with the requirements of the ISO/IEC 15045 series and ISO/IEC 18012 series of standards

Note 1 to entry: For an HES gateway, a WAN is a network outside the protected area and a HAN is a network inside the protected area.

3.1.4
local
logically situated within the premises

3.1.5
privacy
freedom from being observed or disturbed

3.1.6
remote
logically situated outside the premises

3.1.7
risk
probability and magnitude of a harmful or damaging event or condition

3.1.8
safety
protection from, or unlikelihood of causing, danger or injury

3.1.9
security
freedom from danger or threat

Note 1 to entry: Security as used in this document is often referenced as "cybersecurity" to protect data.

3.1.10
user
natural person

3.1.11
vulnerability
weakness that can be exploited

3.1.12
wide area network
WAN
network that connects communication devices in the environment external to the premises protected area

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3.2 Abbreviated terms

DSS	distributed secure systems
HAN	home area network
HES	home electronic system
HES-CLDPE	common language direct protocol data unit exchange
HES-CLIP	common language internal protocol
HES-CLME	common language message exchange protocol
ID	identifier
OS	operating system
WAN	wide area network

4 Conformance

An HES gateway system (including service modules and interface modules) conforming to this document shall implement those features (as appropriate to the services being implemented) required to cover the following clauses:

– 5.3.7 (internal communication bus concept); and
– 5.3.8 (DSS principle and practice); and
– 5.4 (operational protections); and
– 5.5 (risk management) requirements; and
– 5.6 (privacy, security, and safety guidelines and requirements); and
– Clause 6 (common services) requirements.

5 Protection of privacy, security, and safety

5.1 Privacy, security and safety concepts and principles in the HES gateway

The purpose of the HES gateway is to:

a) provide communications and interoperability among premises networks, services, and devices, and also between premises networks, services, devices, and wide area (external) networks and services,
b) provide a platform for management of premises network application services, and
c) provide protection for premises users, networks and devices from risks to privacy, security, and safety.

The HES gateway is a system with an internal architecture composed of a set of HES gateway modules as described in 5.2 and 5.3.

5.2 Structural protections provided by the HES gateway system

Figure 2 shows how the HES gateway system operates within the premises and shows the coverage of the HES gateway standards (ISO/IEC 15045 and ISO/IEC 18012 series).

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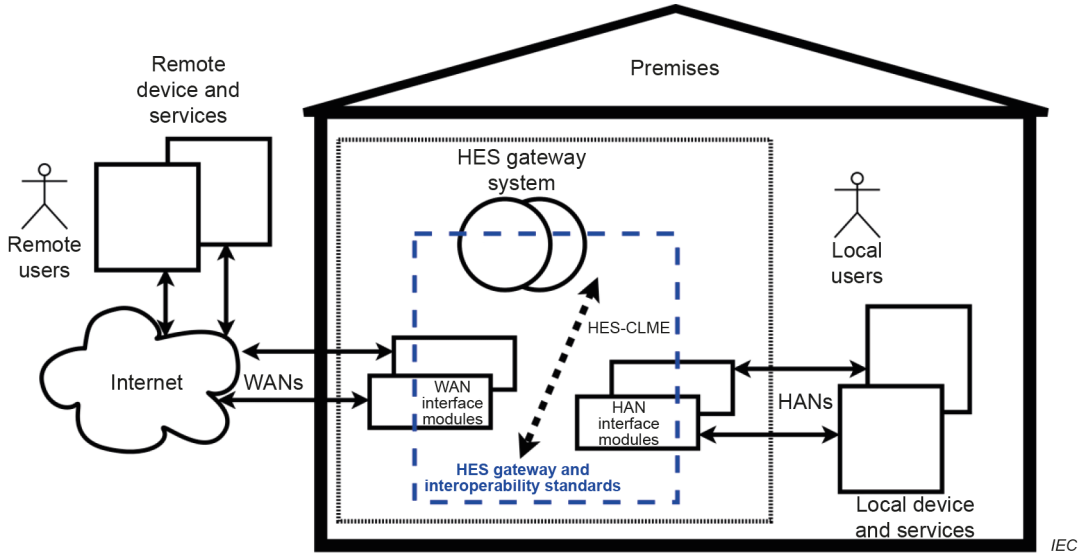

Figure 2 – HES gateway generalized architecture

HAN or WAN interface modules translate messages from or to their native HAN or WAN protocol from or to the HES gateway internal bus, called HES common language message exchange (HES-CLME). Within the gateway bus, HAN or WAN interface modules communicate with their appropriate service modules depending on the nature of the specific service they are intended to perform. HAN or WAN interface modules shall not communicate directly with other HAN or WAN interface modules, except through a service module. Service modules can communicate with appropriate interface modules or other service modules.

5.3 Interface and application services protections

5.3.1 Key concepts, principles and practices

5.3.2 to 5.3.8 describe the key HES gateway concepts, principles, and practices that shall be incorporated into the modular architecture and functionality of the HES gateway where relevant. These concepts, built upon ISO/IEC 15045-2, relate to privacy, security and safety.

5.3.2 HES concept

The Home Electronic System (HES) is a set of standards representing a specific coherent communication, control, and monitoring environment (standardizing networks, devices, applications, and a gateway) for homes and buildings.

5.3.3 HES gateway concept

A communications gateway is defined as an interface between dissimilar networks. The HES gateway is a specific standardized modular gateway for interfacing among multiple dissimilar networks or home area networks, and also providing an application platform. It anticipates and supports certification of conformance to a standard encouraging an open market in compatible and interoperable products.

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