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Date: 19 March 2024

Origin: International

Latest date for receipt of comments: 10 April 2024

Project No. 2022/00723

Responsible committee: IST/6/-/12 Home Electronic Systems

Interested committees:

Title: BS ISO/IEC 18012-4 Information technology - Guidance for the use of database language SQL

Part 4: Event encoding

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



JTC1-SC25/3231/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

ISO/IEC 18012-4 ED1

DATE OF CIRCULATION:

2024-03-15

CLOSING DATE FOR COMMENTS:

2024-05-10

SUPERSEDES DOCUMENTS:

JTC1-SC25/3089/CD, JTC1-SC25/3170A/CC

IEC ISO/IEC JTC 1/SC 25 : INTERCONNECTION OF INFORMATION TECHNOLOGY EQUIPMENT

SECRETARIAT:

Germany

SECRETARY:

Mr Marco Peter

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 23,SyC AAL,SEG 9,ISO/IEC JTC 1/SC 41

PROPOSED HORIZONTAL STANDARD:

☐

Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

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TITLE:

Information Technology—Home Electronic System—Guidelines for product interoperability—Part 4: Event encoding

NOTE FROM TC/SC OFFICERS:

Project Manager and Experts have completed their work approved by the working party and ready for CD2 ballot.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Information technology –
Home Electronic System –
Guidelines for product interoperability –
DRAFT
Part 4: Event Encoding**

FOREWORD

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107 International Standard ISO/IEC 18012-4 has been prepared by subcommittee 25:
108 Interconnection of information technology equipment, of ISO/IEC joint technical committee
109 1:Information Technology.

110 This edition includes the following significant technical changes with respect to the previous
111 edition:

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

113

114 Full information on the voting for the approval of this International Standard can be found in the
115 report on voting indicated in the above table.

116 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

117 The committee has decided that the contents of this document will remain unchanged until the
118 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
119 the specific document. At this date, the document will be

- 120 • reconfirmed,
- 121 • withdrawn,
- 122 • replaced by a revised edition, or
- 123 • amended.

124

125 The National Committees are requested to note that for this document the stability date
126 is 20XX..

127 this text is included for the information of the national committees and will be deleted at the
128 publication stage.

129

INTRODUCTION

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

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

147 In summary, the HES gateway series specifies a standardized, modular, dedicated, private,
148 internal network system that includes:

- 149 • interfaces (i.e., interface modules) for communications and semantic translation among
150 dissimilar home or building area networks (HANs), and between a HAN and external wide
151 area networks (WANs),
- 152 • a platform for supporting a variety of application services (i.e., service modules), and
- 153 • a secure communication path among these modular elements with access restricted to the
154 appropriate elements in order to protect data, safety and privacy.

155 Interworking is achieved with a translation process by which each a message between devices
156 on networks that use different protocols (including different application languages) are first
157 converted into a common HES (internal) linguistic expression and then back into an equivalent
158 message for the other network. This conversion is accomplished by an *interworking function*
159 (IWF) residing in interface modules for each network. These messages are initiated by changes-
160 of-state relating to objects associated with devices connected to networks, and are known as
161 *events*. The HES *common language message exchange* (HES-CLME) event messages employ
162 a standardized syntax and semantic expressions defined by the HES *Lexicon* specified in
163 ISO/IEC 18012, Part 3 *Lexicon*. The format of the messages, (i.e., the message protocol data
164 unit (PDU) are defined in this document).

165 **Relation to existing 15045 series and 18012 series work**

166 The HES gateway system is described in ISO/IEC 15045-1 *Home Electronic System (HES)*
167 *gateway – Part 1: A residential gateway model for HES*. Several structural configurations of the
168 HES gateway system are described in ISO/IEC 15045-4-1 *HES gateway – Part 1: Physical*
169 *structural class and module requirements*. All classes use the HES interoperability system
170 described above. However, in some that use physically separated HES gateway modules,
171 communications among modular elements is provided by a dedicated private internet serial bus
172 (based on Ethernet, see RFC 1918) that utilizes a set of protocols described in ISO/IEC 15045-
173 2 *HES gateway – Part 2: Modularity and protocol*, which is now known as common language
174 message exchange (HES-CLME).

175 The ISO/IEC 18012-1 *Guidelines for product interoperability – Part 1: Introduction* introduces
176 the necessity for an interoperability standard among home system applications to ensure that
177 applications can interoperate in a safe, reliable, predictable and consistent manner. The
178 interworking function (IWF) is specified in ISO/IEC 18012-2, *Guidelines for product*
179 *Interoperability – Part 2: Taxonomy and application interoperability model*. The message
180 content (protocol data unit or PDU) is defined in ISO/IEC 18012-3, *Guidelines for product*
181 *Interoperability – Part 3: Lexicon* and in ISO/IEC 18012-4, *Guidelines for product*

182 *Interoperability – Part 4: Event encoding*. All HES gateway structural class configurations use
183 the same interworking functions, including lexicon, and event encoding.

184 **Lexicon and event encoding**

185 The Part 3 *Lexicon* specifies the standardized HES application objects, functions (actions), and
186 variables, as well as their expression (symbolic encoding) and their semantic meaning and their
187 syntactic usage. These are the elements needed to construct IWFs for each specific network.
188 Because of the dynamic heterogeneous nature of the home and building networking
189 environment, it is intended that these elements, including the IWFs for each network be
190 maintained in a standardized online metadata registry to allow for future expansion while
191 maintaining semantic interoperability. As the Lexicon is expanded, there will be coordination
192 with the appropriate trade or standards organizations to ensure the semantic meanings cover
193 the range of applications and systems of those industries.

194 In addition, standardized test procedures, plugfests, and technical guidance reports are
195 anticipated in the future to prove completeness and ensure interoperability among the range of
196 applications and systems.

197 This Part 4 *Event encoding* specifies the specific format of the PDUs for various events to be
198 utilized in serial bus data packet exchange (e.g., HES-CLIP), or direct API exchanges (e.g.
199 HES-CLDPE) within a gateway. The format provides fast reliable message exchanges with low
200 complexity requirements.

Figure 1 shows the core interoperability and HES gateway series of standards and where this ISO/IEC 18012-4 standard fits into this series.

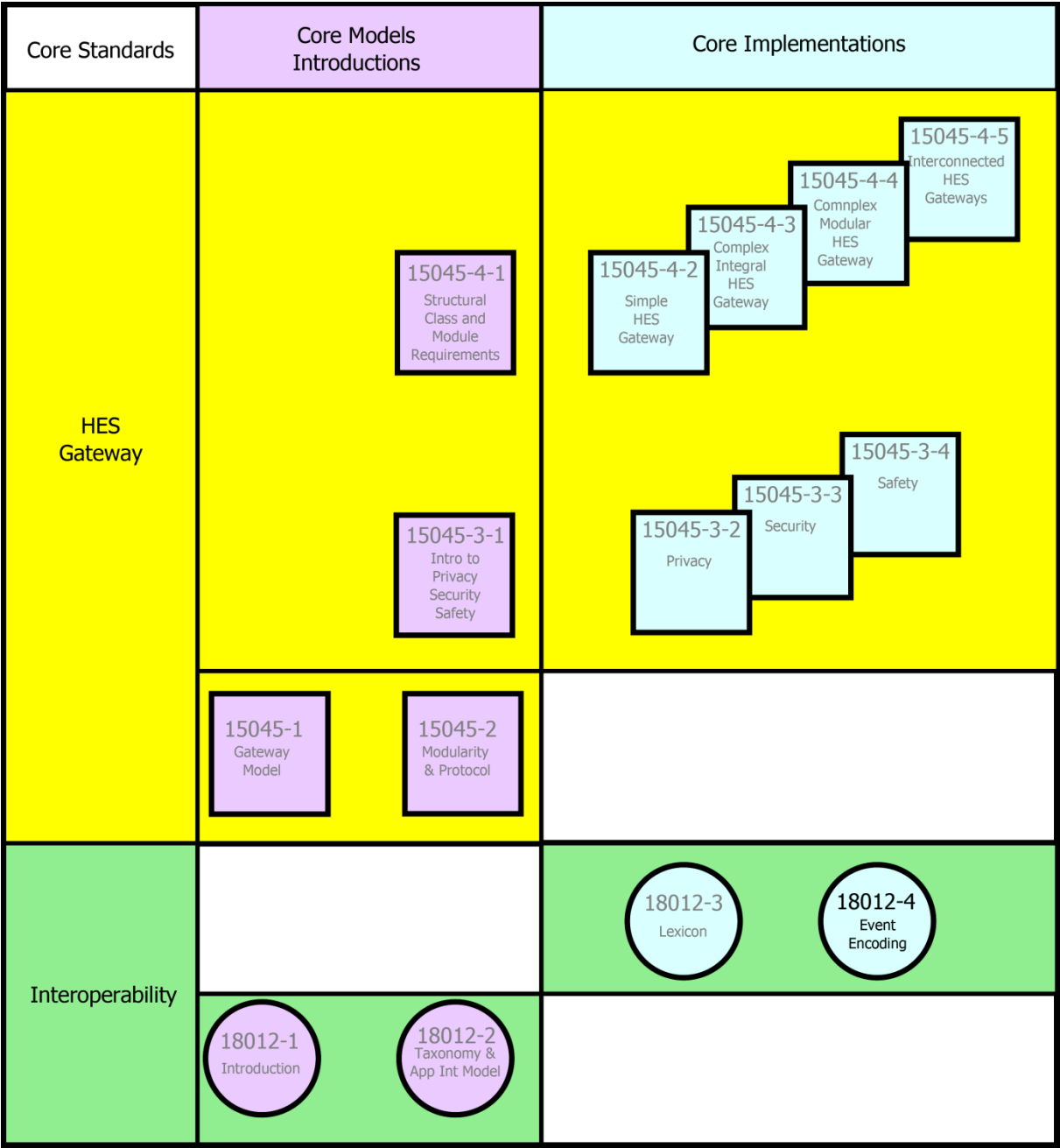


Figure 1 – ISO/IEC 18012-4 Standard within the Core Interoperability and HES Gateway Standards

INFORMATION TECHNOLOGY– HOME ELECTRONIC SYSTEM (HES) – GUIDELINES FOR PRODUCT INTEROPERABILITY

Part 4: Event encoding

1 Scope

This document specifies an event exchange format that defines the encoding of individual events in the Interoperability Domain (ID). This event format is used to encode events for exchange across the “event bus” within the ID.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15045-1:2004, *Information technology – Home Electronic System (HES) gateway – Part 1: A residential gateway model for HES*

ISO/IEC 15045-2:2012, *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: Introduction to privacy, security, and safety [In progress]*

ISO/IEC 15045-3-2, *Information technology – Home electronic system (HES) gateway – Part 3-2: Privacy framework [In progress]*

ISO/IEC 15045-4-1, *Information technology – Home electronic system (HES) gateway – Part 4-1: HES gateway structural class and module requirements [In progress]*

ISO/IEC 18012-1:2004, *Information technology – Home Electronic System (HES) – Guidelines for product interoperability – Part 1: Introduction*

ISO/IEC 18012-2:2012, *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 [In progress]*

RFC 0768; *User Datagram Protocol*

RFC 1918; *Address Allocation for Private Internets*

RFC 3986; *Uniform Resource Identifier (URI): Generic Syntax*

RFC 4180; *Common Format and MIME Type for Comma-Separated Values (CSV) Files*

RFC 6762; *Multicast DNS*

RFC 6763; *DNS-Based Service Discovery*

RFC 7252; *The Constrained Application Protocol (CoAP)*

RFC 7641; *Observing Resources in the Constrained Application Protocol (CoAP)*

RFC 7950; *Block-Wise Transfers in the Constrained Application Protocol (CoAP)*

RFC 8085; *UDP Usage Guidelines*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1

address designator

representative of an object that relates to addressing

3.1.2

comma-separated values

CSV

sequence of values that are separated by commas and records that are separated by carriage returns/line feeds according to RFC 4180

3.1.3

constrained application protocol

CoAP

transfer protocol for use with nodes with limited capability and on networks with limited capacity or that would limit impact on the networks used as specified in RFC 7252

3.1.4

data reference address

complete address of an object including the hierarchical address that references data to which the object contains (instead of the name)

3.1.5

dns-based service discovery

DNS-SD

discovery of services through the domain name system as specified in RFC 6763

3.1.6

dns-sd txt records

format of records using the domain name system service discovery that allows for additional data to be discovered

3.1.7

event

change of state relating to an object

3.1.8 Note 1 to entry: including user, remote, binding map, interface, and service objects

hierarchical address

address of an object represented as a subordinate to other objects

3.1.9

HES gateway system

HES gateway use-case with specific in-premises networks and devices, and potentially off-premises networks

3.1.10

home electronic system

HES

collection of devices and components operating within the premises and interconnected over one or more networks, in conformance with HES-related ISO/IEC standards

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

3.1.11

home electronic system common language internal protocol

HES-CLIP

protocol for messaging among physical HES gateway modules

Note 1 to entry: This protocol is based on Ethernet on the lower OSI layers and IP on the middle layers