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Information technology – Home electronic system (HES) gateway – Part 2: Modularity and protocol

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CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 8
2 Normative references 8
3 Terms, definitions and abbreviations 8
3.1 Terms and definitions 8
3.2 Abbreviations 11
4 Conformance 12
5 Architecture 12
5.1 Architectural model 12
5.2 Design philosophy 14
5.2.1 General approach 14
5.2.2 Distributed gateway system (DGS) 14
5.2.3 Modularity 15
5.2.4 Common interoperability platform 15
6 Modularity requirements 15
7 HES-gateway system 16
7.1 Conceptual process model 16
7.1.1 Common interoperability framework (CIF) 16
7.1.2 Generic interworking function (GIWF) 17
7.2 Physical architecture 17
7.3 Modularity 18
7.3.1 General 18
7.3.2 WAN access module 19
7.3.3 HAN access module 21
7.3.4 Service module 22
7.4 Data flows 23
7.4.1 General 23
7.4.2 Control plane 24
7.4.3 Content (data) plane 24
8 Intermediate processes 24
8.1 General 24
8.2 Protocol stacks 24
8.2.1 Generalised model 24
8.2.2 Specific model – Simple gateway 25
8.2.3 GIWF application 26
8.2.4 Data flow control plane signalling 26
8.3 Intermediate bus (GL bus) and protocol (GL protocol) 27
8.3.1 General 27
8.3.2 Lower layers 27
8.3.3 Middle layers 27
8.3.4 Upper layers 27
8.4 Gateway management 28
Annex A (informative) Case examples 29
A.1 Overview of case examples 29

A.2 VDSL scenario 29
A.3 DBS/DSL scenario 30
A.4 Healthcare management scenario 31
A.5 DSL/HomePNA scenario 31
Annex B (informative) Intermediate logical bus topologies 33
B.1 Overview of intermediate bus topologies 33
B.2 Mesh topology 33
B.3 Star topology 33
B.4 Combined mesh and star topology 34
Annex C (informative) Distributed gateway extension methods 35
Bibliography 36

Figure 1 – Options for home-gateway configurations 8
Figure 2 – Interoperating networks and domain of HES-gateway standard 13
Figure 3 – Alternative distributed modular architectural models 14
Figure 4 – Common interoperability framework (CIF) 17
Figure 5 – HES-gateway architectural domains 18
Figure 6 – HES-link module linkage model 19
Figure 7 – WAN access module block diagram 20
Figure 8 – HAN access module block diagram 21
Figure 9 – Service module block diagram 22
Figure 10 – Data flows 23
Figure 11 – HES-gateway generalised protocol stack model 25
Figure 12 – HES-gateway special case: simple gateway protocol stack model 26
Figure A.1 – VDSL scenario 29
Figure A.2 – DBS/DSL scenario 30
Figure A.3 – Cable/DSL/energy management/ZigBee scenario 30
Figure A.4 – Healthcare management scenario 31
Figure A.5 – DSL/HomePNA Scenario 31
Figure B.1 – Mesh topology 33
Figure B.2 – Star topology 34
Figure B.3 – Combined mesh and star topology 34
Figure C.1 – HES-gateway GL bus extension methods 35

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 2: Modularity and protocol

FOREWORD

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2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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International Standard ISO/IEC 15045-2 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 15045 series, under the general title *Information technology – Home electronic system (HES) gateway*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

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

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INTRODUCTION

As the market has developed for home systems, the number of communications protocols for home networks and for access to the home has increased. This has occurred even while ISO/IEC standards for these networks have been developed and published. Continuing technological progress also suggests that such proliferation will persist, and that no single technology or standard is likely to prevail.

Therefore, standards to enable interoperability among applications implemented on incompatible networks are being written. This standard addresses the gateway, which provides an interconnection between an access network (a wide area network) and one or more home networks (home area networks).

This standard is part of a series of standards and technical reports for the Home Electronic System (HES) that deal with the topic of control and communication networks in homes and small buildings. ISO/IEC 15045-1, published in 2004, defines a basic model of the residential gateway, including functional requirements.

This standard defines a common framework for implementing gateway platforms to achieve interconnection and interoperability of home system products and applications. The objective is to support products from any manufacturer or provider in a manner that is safe, reliable, predictable and consistent. Service providers such as cable TV companies, Internet service providers and telephone companies are each installing a gateway to deliver digital data and audio/video streams, therefore some houses contain multiple gateways. As a consequence, an optional feature of this standard specifies how to interconnect multiple gateways in one house so that these gateways can co-ordinate service offerings.

A communications gateway provides an interconnection between a wide area network (WAN) and local area network (LAN) where the protocols on each network differ. The gateway is responsible for protocol translation of signals, message formats and timing. The home systems industry has adapted LAN technology for Home Area Networks (HANs). Ideally, each home system would be based on one HAN and all attached devices and appliances would use one communications protocol. In reality, multiple incompatible HAN technologies are being marketed. Also, each service provider is installing a separate gateway (e.g., DSL, cable broadband and satellite). Therefore, it is possible that a user will purchase and install products employing two (or more) dissimilar HANs within the same premises. These HANs may be connected to WANs via separate incompatible gateways. However, the user expects these products and networks to behave as if they were the same logical network in order to deliver home services, such as:

- entertainment (audio/video);
- data/internet access;
- communication (telephony);
- energy management;
- health care and monitoring;
- environmental control (heating and cooling);
- security and safety monitoring;
- appliance telemetry;
- lighting control.

This standard accomplishes interoperability by specifying a modular architecture and set of protocols for interconnecting the modular elements with a common signalling bus. It relies on a common intermediate language to achieve interoperability among applications called the Common Interoperability Framework (HES-CIF), described in this standard. Parts of ISO/IEC 18012 define the network-specific interworking functions needed to provide conforming products.

This International Standard defines a universal gateway system by specifying interfaces between

- standalone local/Home Area Networks (HANs) and connected devices,
- multiple implementations of local/home area networks (HANs) and connected devices,
- Wide Area Networks (WANs) (also known as access networks) and applications connected to Home Area Networks (HANs) and connected devices.

This standard establishes a framework for implementation of a general-purpose interoperability platform or “translator” among home area networks or between wide area networks and home area networks. It represents one approach to implementation of the interoperability standard ISO/IEC 18012. This standard does not attempt to specify a central controller or control system; and does not attempt to improve or resolve disparities or shortcomings among transmission technologies, protocols, or application languages. However, this standard does provide the premises with a platform for supporting any number of specific services and supporting fundamental elements of consumer security (i.e., firewall services), safety and privacy.

This standard is not a design for a specific gateway, but rather it offers an architecture, and therefore it is necessarily abstract. However, this standard is relevant for many commercial gateway configurations. Examples of such implementations are included for information in Annex A.

Summing up, this standard shows how to build a gateway out of modular building blocks. This International Standard does not describe or specify gateway applications, service requirements, network topologies, or how gateways are to be applied within home networks and systems. These specifications are left to other home gateway-related standards.

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 2: Modularity and protocol

1 Scope

This part of ISO/IEC 15045 specifies a gateway architecture that provides an interconnection between one or more Wide Area Networks (WANs) and one or more Home Area Networks (HANs). This standard is not needed for a “simple gateway” linking one WAN to one HAN where there is no intention of future expansion, as illustrated in Figure 1. The scope of this standard applies to a “distributed gateway,” as illustrated in Figure 1 and is also referred to in ISO/IEC 15045-1 as the Complex Modular Gateway. Also, this standard specifies how separate gateways in a single house can interoperate to provide co-ordinated functions.

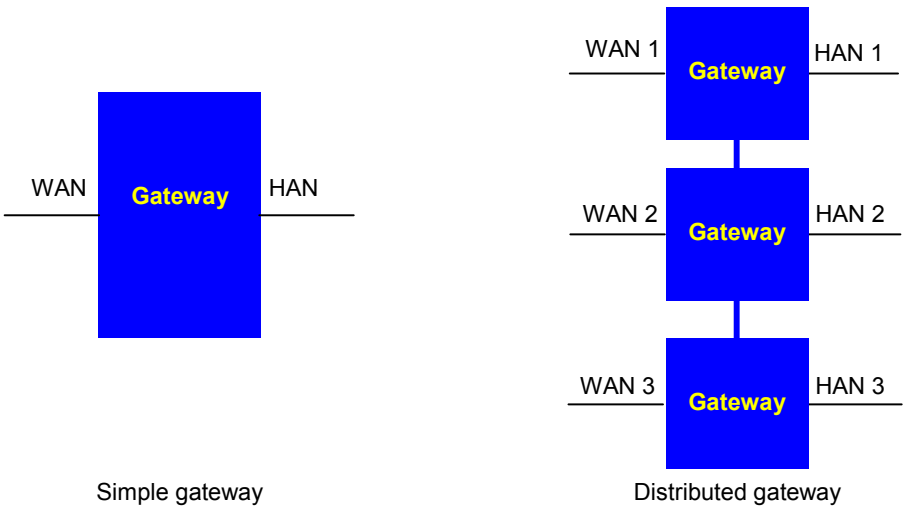

Figure 1 – Options for home-gateway configurations

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 18012-2:—, *Information technology – Home electronic system (HES) – Guidelines for product interoperability – Part 2: Taxonomy and application interoperability model*[1]

1 To be published.