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Information technology – Home electronic system (HES) gateway – Part 1: A residential gateway model for HES

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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 1: A residential gateway model for HES

FOREWORD

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

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

INTRODUCTION

The residential gateway (RG) is a device of the Home Electronic System (HES) that connects home network domains to network domains outside the house, as shown in Figure 1. It supports communications among devices within the premises and systems, service providers, operators and users outside the premises.

The RG enables service and content providers to deliver services such as entertainment, video and broadband digital streams, monitoring for health care, security and occupancy, home appliance control and preventive maintenance, remote metering, and energy management. The RG specified by this standard does not imply the use of any particular protocol such as IP and it is recognised that many forms of the RG will exist using many types of data such as analogue video and broadband digital streams.

The safe and effective delivery of these services places many demands on the facilities of the RG. These include the integrity and security of communications, the delivery of commands to devices in the home from external sources, the blocking of selected commands that may create unsafe conditions, the protection of the home from the risks inherent in a connection to the internet, and facilitating micro-payments. There may be many different configurations of RG. Regardless of the RG configuration, this standard ensures the interoperability of home devices with external services. Also, this standard specifies features to enhance the safety and security of network devices and consumer transactions via the network.

The RG connects the remote user and the internet with the people, equipment, appliances or services in the home. These devices or systems are usually objects or nodes on a particular Home Area Network (HAN).

Residential gateway

Some of the potential interfaces and supported networks of a residential gateway are shown in Figure 1. In all cases the gateway provides the mechanism whereby Wide Area Networks (WANs) communicate with Home Area Networks. The gateway may be a standalone gateway; it may be embedded in another device; or more than one gateway unit may be used. A number of distributed gateway units may display the behaviour of a single gateway.

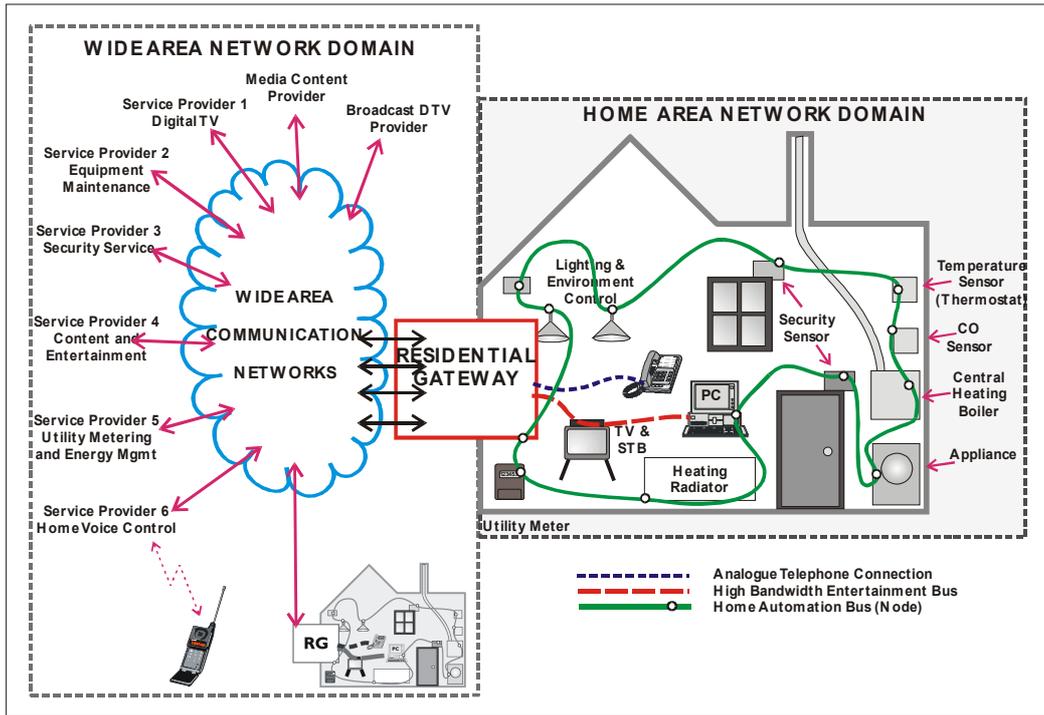


Figure 1 – Typical service provision for home network

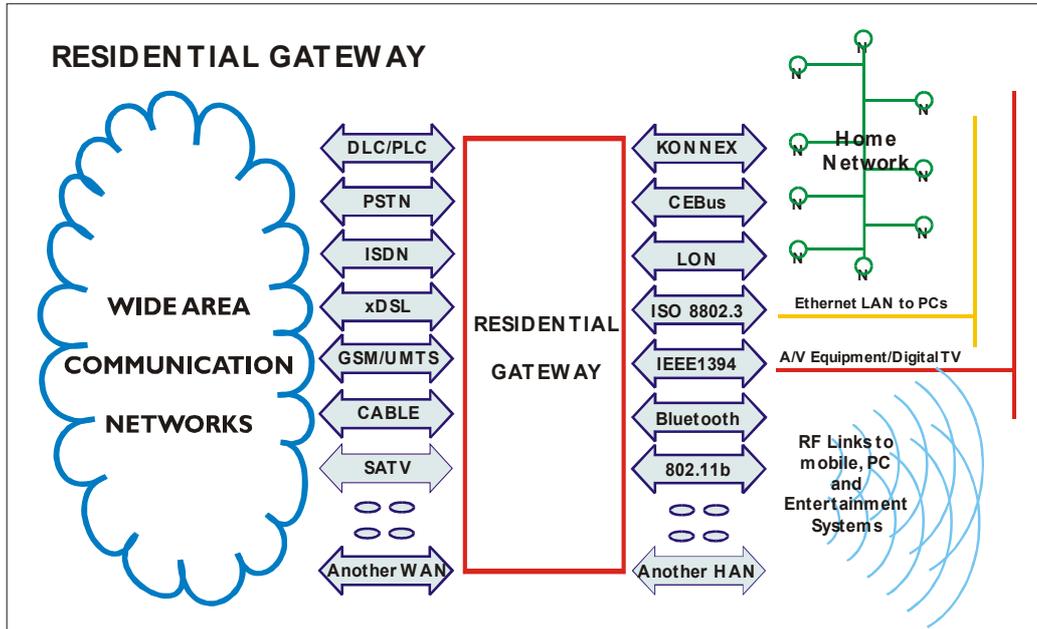


Figure 2 – Diagram of possible RG connections and interfaces

Figure 2 illustrates that multiple WANs and HANs may be supported by the RG. This figure is not intended to imply that all or any of the interfaces or connections shown need to be connected to a residential gateway (or for instance that terrestrial DTV is excluded in favour of SATV).

The physical manifestation of a residential gateway is outside the scope of this standard. This standard accommodates a range of potential configurations. These configurations may range from an approach where a single box acts as interface between two or more WANs and HANs, to a modular dedicated residential gateway, to multiple residential gateways distributed among physically separate locations within the premises.

This standard is based on a black box approach, since it specifies the interfaces of the RG and the function provided but leaves considerable freedom on how these functions are implemented within the black box¹.

This standard is applicable to all communications and other technologies that may be incorporated in the residential gateway and includes both analogue and digital systems.

This document comprises the following:

- requirements of a residential gateway;
- functional safety requirements of a residential gateway, where these are not covered by existing functional safety standards;
- security requirements of a residential gateway;
- options for the Architecture of the residential gateway and the elements of a conforming residential gateway (see Annex A);
- safety requirements of home systems connected to Wide Area Networks and the role of the residential gateway (see Annex B);
- security requirements of home systems connected to Wide Area Networks and the role of the residential gateway (see Annex C).

This document offers a future-proof², forwards and backwards compatible standard for residential gateways and for networks and devices to which they are interfaced.

¹ In systems terminology a 'black box' refers to an object that has inputs, outputs and carries out functions but for which the means and methodology that convert the inputs into outputs are not specified. Only inputs, outputs and functions are specified.

² A system that is called 'future proof' is expected to be adapted to technologies and meet requirements that were not specified when it was designed but may be needed in future.

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) GATEWAY –

Part 1: Residential gateway model for HES

1 Scope

1.1 Overview

This part of ISO/IEC 15045 specifies the minimum functional requirements of a residential gateway (RG) and the documentation to be provided. The standard specifies what a gateway should do in order to deliver services in a suitably safe, secure and future-proof way without being prescriptive. It also gives functional requirements.

1.2 Functional safety

This standard specifies certain safety features where commands sent from remote places to devices on the premises could cause danger to persons or property.

While this standard only specifies minimum requirements for the gateway architecture, gateway operation, and associated home systems in terms of safety, it provides an extensive checklist of functional situations that should be treated with the utmost caution and recommends appropriate measures.

1.3 Privacy and security

This standard specifies security measures to ensure the integrity of information that may pass through the residential gateway.

A residential gateway operating between the internet and the home creates significant concerns for security to the user.

Particular attention is drawn to safety, security and privacy. The attention of the user (consumer, maintainer or application service provider (ASP)) of the gateway is drawn to dangers resulting from unexpected system interoperation, from unauthorised access and from compromise of private user information. RGs that are stated to conform to this standard will be evaluated by the RG manufacturers for potential functional safety and/or security hazards arising from systems integration.

2 Normative references

The following referenced documents are indispensable for the application 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 7498, *Information technology – Open Systems Interconnection – Basic Reference Model*

ISO/IEC 14762, *Information technology – Home Control Systems – Guidelines for functional safety*

ISO/IEC 18012-1, *Information technology – Home electronic system – Guidelines for product interoperability – Part 1: Introduction*³

³ To be published.