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Information technology – Home electronic system (HES) architecture – Part 5-11: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote user interface

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FOREWORD

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International Standard ISO/IEC 14543-5-11 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

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.

The list of all currently available parts of the ISO/IEC 14543 series, under the general title *Information technology – Home electronic system (HES) architecture*, can be found on the IEC and ISO websites.

In this document, the following print types are used:

- CAPITAL LETTERS: for special functions or terms
- *italics*: for abstract entity names in the IGRS RUI model

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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

The ISO/IEC 14543-5 series of standards specifies the services and protocol of the application layer for Intelligent Grouping and Resource Sharing (IGRS) devices and services in the Home Electronic System.

The ISO/IEC 14543-5 series includes the following parts.

- IGRS Part 5-1: Core protocol
  - Specifies the TCP/IP protocol stack as the basis and the HTTP protocol as the message-exchange framework among devices.
  - Specifies a series of device and service interaction/invocation standards, including device and service discovery protocol, device and service description, service invocation, security mechanisms, etc.
  - Specifies core protocols for a type of home network that supports streaming media and other high-speed data transports within a home.
- IGRS Parts 5-2#: Application profile
  - Based on the IGRS Core Protocol.
  - Specifies a device and service interaction mechanism, as well as application interfaces used in IGRS basic applications.
  - Multiple application profiles are specified, including:
    i) Part 5-21: AV profile
    ii) Part 5-22: File profile
- IGRS Part 5-3: Basic application
  - Includes an IGRS basic application list.
  - Specifies a basic application framework.
  - Specifies operation details (device grouping, service description template, etc.), function definitions and service invocation interfaces.
- IGRS Part 5-4: Device validation
  - Defines a standard method to validate an IGRS-compliant device.
- IGRS Part 5-5: Device type
  - Specifies IGRS Device types used in IGRS applications.
- IGRS Part 5-6: Service type
  - Specifies basic service types used in IGRS applications.
- IGRS Part 5-7: Remote access system architecture
  - Specifies the architecture and framework for the remote access of IGRS devices and services in the Home Electronic System. The remote access communications protocol and application profiles are specified in the following parts of ISO/IEC 14543-5:
    i) ISO/IEC 14543-5-8: Remote access core protocol
    ii) ISO/IEC 14543-5-9: Remote access service platform
    iii) ISO/IEC 14543-5-101: Remote media access profile
    iv) ISO/IEC 14543-5-102: Remote universal management profile
    v) ISO/IEC 14543-5-11: Remote user interface
    vi) ISO/IEC 14543-5-12: Remote access test and verification
  - The relationships among these parts are specified in Part 5-7.

- IGRS Part 5-8: Remote access core protocol
  - Provides detailed system components, system function modules, basic concepts of IGRS remote access elements and their relationships, message exchange mechanisms and security related specifications.
  - Specifies interfaces between IGRS Remote Access (RA) client and service platforms. Defines co-operative procedures among IGRS RA clients.
- IGRS Part 5-9: Remote access service platform
  - Specifies the IGRS RA service platform (IRSP) architectures and interfaces among servers in the service platforms.
  - Based on Part 5-8: Remote access core protocol.
- IGRS Part 5-10#: Remote access application profiles
  - Defines a device and service interaction mechanism for various applications
  - Based on Part 5-8: Remote access core protocol
  - The following profile is under development:
    i) Part 5-101: Remote media access profile. [1] This part defines the common requirements for IGRS RA media users and devices in IGRS networks.
  - Remote universal management profile will form the subject of a future Part 5-102. This part will specify a mechanism for integrating devices with both relatively high and low processing capabilities into IGRS networks. It will also specify universal remote device discovery and a management framework.
  - Additional application profiles will be specified in the future.
- IGRS Part 5-11: Remote user interface
  - Specifies adaptive user interface generation and remote device control mechanisms suitable for different remote access applications and devices.
- IGRS Part 5-12: Remote access test and verification [2]
  - Defines a standard method to test and verify IGRS-RA compliant device and service interfaces.

[1] Under preparation. Stage at the time of publication: ISO/IEC DIS 14543-5-101:2017.

[2] Under preparation. Stage at the time of publication: ISO/IEC DIS 14543-5-12:2017.

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

Part 5-11: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote user interface

1 Scope

This part of ISO/IEC 14543-5 specifies a remote user interface (RUI) for the ISO/IEC 14543-5 series on IGRS for HES Class 2 and Class 3. It defines the mechanisms necessary for allowing an adaptive user interface to be displayed on and controlled by devices or control points from a remote location.

This document is applicable to IGRS local and remote access (RA) devices.

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 14543-5-1:2010, *Information technology – Home electronic system (HES) architecture – Part 5-1: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Core protocol*

ISO/IEC 14543-5-8, *Information technology – Home electronic system (HES) architecture – Part 5-8: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote access core protocol*

ISO/IEC 15045 (all parts), *Information technology – Home electronic system (HES) gateway*

IETF RFC 2045, *Multipurpose Internet Mail Extensions (MIME) – Part 1: Format of Internet Message Bodies*

IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*

IETF RFC 4648, *The Base16, Base32, and Base64 Data Encodings*

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 terminological databases for use in standardization at the following addresses:

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

3.1.1
remote user interface
RUI
interface that is used for remote interaction with IGRS users

Note 1 to entry: The IGRS RUI can display information, play multimedia contents to the users or receive users' inputs.

3.1.2
RUI Client
RUIC
logical device in an IGRS network that possesses RUI retrieval, rendering capabilities and provides a user input interface to acquire messages for the RUIS

Note 1 to entry: An RUIC device may be physically a PC, a TV, a mobile phone, etc.

3.1.3
RUI Server
RUIS
logical device in an IGRS network that possesses capabilities for RUI contents storage and for providing RUI contents to the RUICs

Note 1 to entry: An RUIS device may be physically a PC, a set-top-box, a server, etc.

3.1.4
RUI Control Point
RUICP
logical device in an IGRS network that possesses RUI discovery and control capabilities.

Note 1 to entry: An RUICP device may be physically integrated into an RUIC or RUIS, or may be a stand-alone device.

3.2 Abbreviated terms

DC	Delivery Context
IGRS	Intelligent Grouping and Resource Sharing
RA	Remote Access
RDL	RUI Description Language
RUI	Remote User Interface
RUIS	RUI Server
RUIC	RUI Client
RUICP	RUI Control Point
SSDP	Simple Service Discovery Protocol
UI	User Interface

4 Conformance

For conformance to this document the following applies.

- The IGRS RUI system architecture shall conform to Clause 5.
- The device and service types of RUI Server (RUIS) and RUI Client (RUIC) shall conform to Clause 6.
- The abstract entities in IGRS RUI shall conform to Clause 7.
- The RUI Description Language (RDL) shall conform to Clause 8.

5 IGRS RUI overview

5.1 IGRS RUI features

The IGRS RUI supports the following features.

a) Discovery of an RUI: the RUIS lists available UIs for the user and exposes capabilities that it requires and supports.

b) Connecting to an RUI: the RUIC can connect to an RUIS and retrieve a matching RUI. A separate RUI Control Point (RUICP) can also set up or control this connection.

c) Presenting RUI content: an RUIS presents RUI contents to an RUIC. The condition of an RUIC is described in RDL. This enables the RUI device to adjust the RUI contents according to the condition of the RUIC.

5.2 RUI configuration models

5.2.1 Overview

Three basic models for RUI configuration are defined:

a) Internet RUI configuration model;

b) 2-tier RUI configuration model;

c) 3-tier RUI configuration model.

5.2.2 Internet RUI configuration model

In this configuration, the RUIS is on the Internet. An RUIC may be discoverable (stand-alone RUICP) or non-discoverable (RUICP and RUIC in the same box). The Internet RUI configuration model is shown in Figure 1.

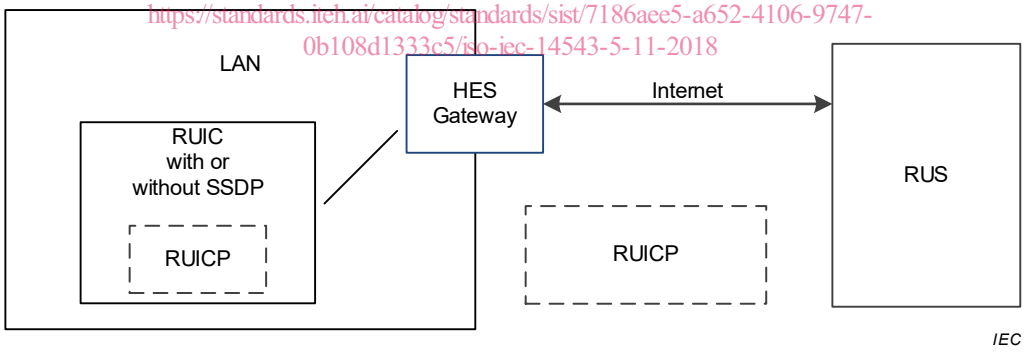

Figure 1 – Internet RUI configuration model

The HES gateway is specified in the ISO/IEC 15045 series (ISO/IEC 15045-1 and ISO/IEC 15045-2 are published). The HES gateway shall be used to connect the RUIC on the LAN and the Internet.

NOTE ISO/IEC 15045-3, under development, is expected to address privacy and security of data passing through the HES gateway.

5.2.3 2-tier RUI configuration model

In this configuration, all the RUI entities are on the same LAN, and the RUIS is discoverable. The RUIC is not discoverable in this configuration, so it needs to have a RUICP in it. The 2-tier RUI configuration model is shown in Figure 2.