



BSI Standards Publication

Information technology - Home electronic systems (HES) architecture

Part 5-11: Intelligent Grouping and Resource Sharing for
HES Class 2 and Class 3 - Remote user interface

National foreword

This British Standard is the UK implementation of ISO/IEC 14543-5-11:2018.

The UK participation in its preparation was entrusted to Technical Committee IST/6/-/12, Home Electronic Systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

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© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 95755 0

ICS 35.200

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2018.

Amendments/corrigenda issued since publication

Date	Text affected
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ISO/IEC 14543-5-11

Edition 1.0 2018-03

INTERNATIONAL STANDARD



**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**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.200

ISBN 978-2-8322-5531-5

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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	9
2 Normative references	9
3 Terms, definitions and abbreviated terms	9
3.1 Terms and definitions.....	9
3.2 Abbreviated terms.....	10
4 Conformance.....	10
5 IGRS RUI overview.....	11
5.1 IGRS RUI features	11
5.2 RUI configuration models.....	11
5.2.1 Overview	11
5.2.2 Internet RUI configuration model	11
5.2.3 2-tier RUI configuration model	11
5.2.4 3-tier RUI configuration model	12
5.3 RUIS and RUIC types	12
5.4 RUI architecture.....	12
5.4.1 Detailed RUI architecture.....	12
5.4.2 RUIC architecture	13
5.4.3 RUI Server architecture	14
6 IGRS type definitions for RUIS and RUIC	15
6.1 Overview.....	15
6.2 IGRS device types for RUIS and RUIC.....	15
6.3 IGRS service types for RUIS and RUIC.....	16
6.4 IGRS invocation interfaces for RUIC service	16
6.5 IGRS invocation interface for RUIS service	16
6.6 IGRS RUI operation scenarios	16
6.6.1 Overview	16
6.6.2 Discovery and retrieval of server information	16
6.6.3 Connecting	16
6.6.4 Controlling IGRS devices using IGRS RUI	17
7 Abstract entity in IGRS RUI	18
8 RUI Description Language (RDL).....	21
8.1 Overview.....	21
8.2 RDL element.....	21
8.3 RDLPackage element	22
8.4 RDLInfo element.....	23
8.5 Declaration element.....	23
8.6 Package element	24
8.7 LayoutContainer element	24
8.8 SceneContainer element.....	25
8.9 Item element.....	25
8.10 Layout element	26
8.11 Scene element.....	27
8.12 Group element.....	28
8.13 Asset element.....	28

8.14	ItemRef element	29
8.15	LayoutRef element.....	29
8.16	SceneNavigation element	30
8.17	Annotation element.....	30
8.18	Descriptor element.....	30
8.19	Condition element.....	31
8.20	Choice element.....	32
8.21	Selection element	32
8.22	Statement element.....	33
8.23	DCCondition element	34
Annex A (normative) RDL schema		35
Bibliography.....		43

Figure 1 – Internet RUI configuration model.....	11
Figure 2 – 2-tier RUI configuration model.....	12
Figure 3 – 3-tier RUI configuration model.....	12
Figure 4 – Detailed RUI architecture	13
Figure 5 – RUIC architecture	14
Figure 6 – RUIS architecture.....	15
Figure 7 – RUI retrieval from Internet RUIS.....	17
Figure 8 – Example configuration of controlling IGRS device with RUI	17
Figure 9 – Structures of major entities in an IGRS RUI application.....	20
Figure 10 – RDL namespace declaration.....	21
Figure 11 – RDL element definition	22
Figure 12 – RDLPackage element definition.....	22
Figure 13 – Example of an RDLPackage element.....	23
Figure 14 – RDLInfo element definition	23
Figure 15 – Declaration element definition	23
Figure 16 – Package element definition	24
Figure 17 – LayoutContainer element definition	24
Figure 18 – SceneContainer element definition	25
Figure 19 – Item element definition	26
Figure 20 – Layout element definition	27
Figure 21 – Scene element definition	27
Figure 22 – Group element definition	28
Figure 23 – Asset element definition	29
Figure 24 – ItemRef element definition.....	29
Figure 25 – LayoutRef element definition	30
Figure 26 – SceneNavigation element definition.....	30
Figure 27 – Annotation element definition	30
Figure 28 – Descriptor element definition	31
Figure 29 – Condition element definition	31
Figure 30 – Choice element definition	32
Figure 31 – Selection element definition	33

Figure 32 – Statement element definition	34
Figure 33 – DCCondition element definition	34
Table 1 – RUI device type definitions	15
Table 2 – RUI service type definitions	16
Table 3 – Definitions of abstract entities in an IGRS RUI	18

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

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 verification²
 - 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.

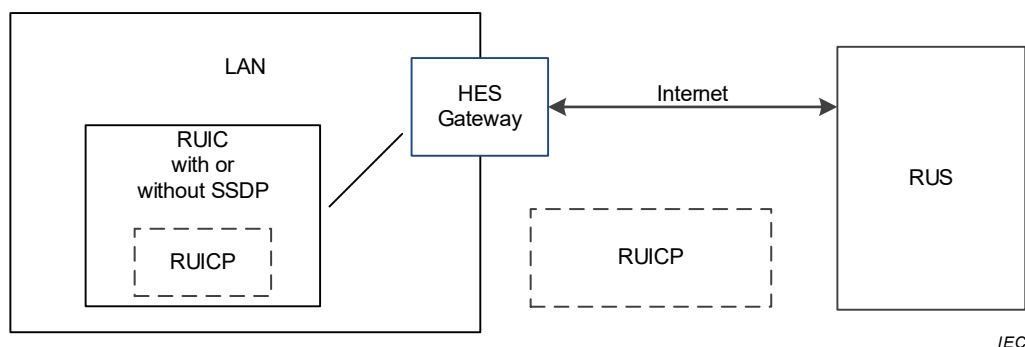


Figure 1 – Internet RUI configuration model

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.

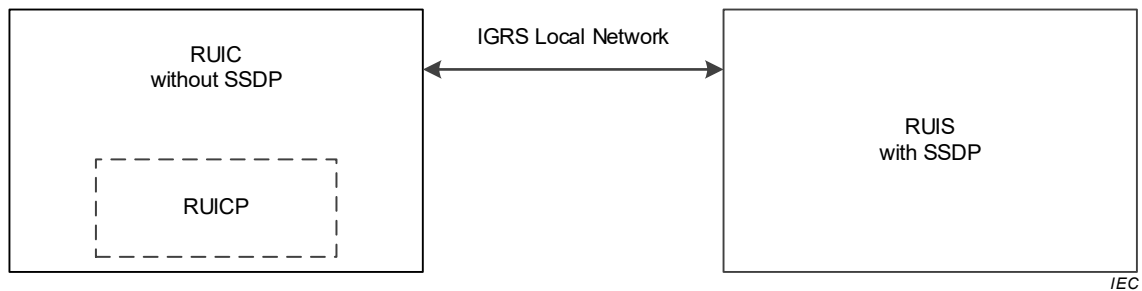


Figure 2 – 2-tier RUI configuration model

5.2.4 3-tier RUI configuration model

In this configuration, all the RUI entities are on the same LAN. The RUIS and RUIC are both discoverable. The RUICP can be stand-alone or reside in the RUIS or RUIC. The 3-tier RUI configuration model is shown in Figure 3.

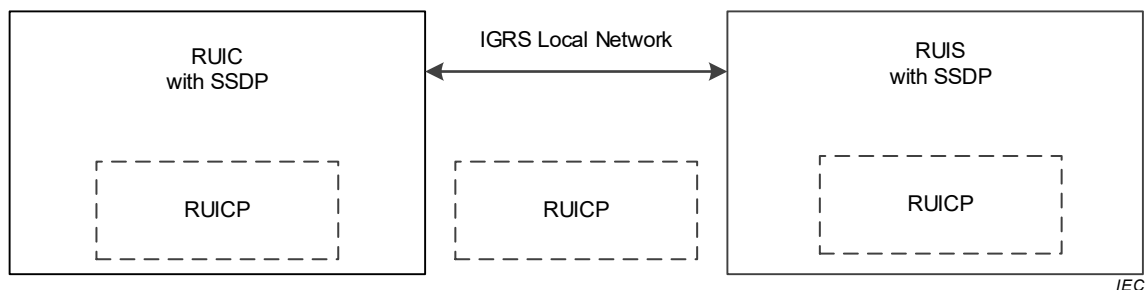


Figure 3 – 3-tier RUI configuration model

5.3 RUIS and RUIC types

Two types are defined for RUIS and RUIC.

- Internet-type: the RUIC or RUIS is not discoverable on an IGRS network.
- IGRS-type: the RUIC or RUIS is discoverable on an IGRS network, and shall be controlled by an RUICP using the IGRS invocation interface specified in ISO/IEC 14543-5-1 and ISO/IEC 14543-5-8.

5.4 RUI architecture

5.4.1 Detailed RUI architecture

The detailed RUI architecture is shown in Figure 4.