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INTERNATIONAL STANDARD

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Information technology – Home electronic system (hes) architecture – Part 5-102: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote universal management profile



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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE – Part 5-102: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote universal management profile

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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 website and ISO website.

The text of this standard is based on the following documents:

FDIS	Report on voting
JTC1-SC25/2898/FDIS	JTC1-SC25/2908/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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INTRODUCTION

ISO/IEC 14543-5 (all parts) specifies the services and protocol of the application layer for intelligent grouping and resource sharing (IGRS) devices and services in the home electronic system. Some parts reference Classes 1, 2 and 3, which are HES designations specified in the HES architecture standard, ISO/IEC 14543-2-1.

ISO/IEC 14543-5 (all parts) includes the following parts.

– ISO/IEC 14543-5-1: 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.

– ISO/IEC 14543-5-2#: 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) ISO/IEC 14543-5-21: AV profile
    ii) ISO/IEC 14543-5-22: File profile

– ISO/IEC 14543-5-3: 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.

– ISO/IEC 14543-5-4: Device validation
  - Defines a standard method to validate an IGRS-compliant device.

– ISO/IEC 14543-5-5: Device type
  - Specifies IGRS device types used in IGRS applications.

– ISO/IEC 14543-5-6: Service type
  - Specifies basic service types used in IGRS applications.

– ISO/IEC 14543-5-7: 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.

– ISO/IEC 14543-5-8: 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.
– ISO/IEC 14543-5-9: Remote access service platform
  - Specifies the IGRS RA service platform (IRSP) architectures and interfaces among servers in the service platforms.
  - Based on ISO/IEC 14543-5-8: Remote access core protocol.
– ISO/IEC 14543-5-101 and ISO/IEC 14543-5-102: Remote access application profiles
  - Defines a device and service interaction mechanism for various applications.
  - Based on ISO/IEC 14543-5-8: Remote access core protocol.
  - Two profiles have been developed:
    i) ISO/IEC 14543-5-101: Remote media access profile. This part defines the common requirements for IGRS RA media users and devices in IGRS networks.
    ii) ISO/IEC 14543-5-102: Remote universal management profile. This part specifies a mechanism for integrating devices with both relatively high and low processing capabilities into IGRS networks. It also specifies universal remote device discovery and a management framework.
  - Additional application profiles will be specified in the future.
– ISO/IEC 14543-5-11: Remote user interface
  - Specifies adaptive user interface generation and remote device control mechanisms suitable for different remote access applications and devices.
– ISO/IEC 14543-5-12: Remote access test and verification
  - Defines a standard method to test and verify IGRS-RA compliant device and service interfaces.

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INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

Part 5-102: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote universal management profile

1 Scope

This part of ISO/IEC 14543 specifies the system architecture and communication protocols of remote universal management profile to achieve intelligent grouping, resource sharing and service collaboration among different devices and controllers. The protocol features are:

a) remote universal device discovery and management framework that includes connection methods and network architecture, device configuration interfaces, management message formats and message exchange flows;

b) request/response message formats for four remote universal management profile device types: water heater, refrigerator, air conditioner, microwave.

This document is applicable to remote access of water heaters, refrigerators, air conditioners, microwave ovens at home, office or other remote environments, to achieve universal management and interactions among these controllers and 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, *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 14543-5-7, *Information technology – Home electronic system (HES) architecture – Part 5-7: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote access system architecture*

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 14543-5-9, *Information technology – Home electronic system (HES) architecture – Part 5-9: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Remote access service platform*

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

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
account server
IGRS RA server that processes services related to user and device account information

3.1.2
application server
IGRS RA server or third-party server located outside of an IGRS RA system that processes application service-related logical functions

Note 1 to entry: The application server provides the approach to access application service logical functions (also called logics). By using the application server, IGRS RA user or device or other server can access the application service logics.

3.1.3
controlled device
device
physical device that is accessible to the controller

3.1.4
controller
physical device that can access a controlled device in the IGRS RA system

Note 1 to entry Controller is typically a mobile device or application such as a smart phone or smart pad, which is handled by an IGRS RA user.

3.1.5
device ID
unique identification of an IGRS RA device

EXAMPLE If the local part of a device ID is “#igrsdevice” and the domain name part of the user ID is “igrs.com”, the device ID is “#igrsdevice@igrs.com”.

Note 1 to entry A device ID consists of a local part and a domain name part. A “@” is used to separate the two parts. Each device ID starts with a “#”.

3.1.6
device verification code
string used to examine if the user has the authority to bind a device

Note 1 to entry: For a device without a user interface, the device verification code is used to bind a device to a user. The device owner guarantees the safety of the device verification code.

3.1.7
IGRS AS
basic service unit composed of one or multiple IGRS servers

Note 1 to entry: Each IGRS AS provides services for a dedicated user and/or device group and constructs an IGRS RA domain. This document defines all of the necessary requirements that allow different IGRS ASs to exchange messages with each other.

3.1.8
IGRS RA agent
functional entity which can provide the IGRS RA service to IGRS LAN devices

Note 1 to entry: The main functionalities of the IGRS RA agent are sending instructions to and receiving instructions from the IGRS RA service platform, and translating the instructions of local IGRS networks to and from those of the IGRS RA networks. The IGRS RA agent provides compatibility of the local IGRS devices to the IGRS RA devices.

3.1.9
IGRS RA device
physical device that is accessible to the IGRS RA user in the IGRS RA system

3.1.10
IGRS RA server
instantiation of a service provider that may be included in an IRSP

Note 1 to entry An IGRS RA server is deployed on the internet. It maintains relationships among IGRS RA user and IGRS devices. It also provides re-transmission of collaborative messages. The IGRS RA user and IGRS device can start a data connection to the IRSP and support interconnections using the data connection and re-transmission functions of the IRSP.

3.1.11
IGRS RA service platform
IRSP
collection of multiple IGRS RA servers that are deployed on the internet to maintain the relationships among IGRS RA user and IGRS RA device and to exchange collaborative messages

Note 1 to entry: IGRS RA user and device can establish connections to the IRSP, can send collaborative messages over these connections and can exchange messages in the servers of the IRSP.

3.1.12
IGRS RA user
entity that uses the IGRS RA devices and application services

Note 1 to entry Generally, an IGRS RA user is a human being. Each IGRS RA user has a unique user ID (identification). A bundle relationship can be established between one IGRS RA user and another. A binding relationship can be established between one IGRS RA user and one IGRS device.

3.1.13
message server
IGRS RA server that processes message exchanging logics (transmitting, receiving, forwarding and blocking, etc.)

3.1.14
server address
ID to identify the network location of a server in IGRS RA system

EXAMPLE One IGRS RA server address could be: “www.igrslab.com:8080”.

Note 1 to entry: Server address format in IGRS RA system is “domain name of server:port”.

3.2 Abbreviated terms

AS	autonomous system
HTTP	hypertext transfer protocol
ID	identification
IGRS	intelligent grouping and resource sharing
IRSP	IGRS RA service platform
LAN	local area network
RA	remote access
RUMP	remote universal management profile
TCP/IP	transmission control protocol/ internet protocol
UI	user interface
XMPP	extensible messaging and presence protocol
WAN	wide area network

4 Conformance

A system that conforms to this document shall be implemented according to Clauses 5 through 7, where the IGRS remote access capabilities including system architecture, message exchange mechanism and work flow shall conform to Clause 6, and the RUMP application protocol for specific device types shall conform to Clause 7.

5 IGRS RUMP overview

RUMP (remote universal management profile) protocol provides specific IGRS remote access application scenarios based on the remote management of all devices at home, office and other remote locations, which is applicable to not only devices with strong processing capability such as TV, PC, set-top box, etc., but also devices with weak processing capability such as refrigerator, microwave oven, washing machine, dishwasher, etc.

RUMP defines the configuration and interface of IP and non-IP devices, the overall system architecture of comprehensive remote control and management of a variety of home devices. It also defines the communication interface, message flow and message format for universal management of devices, as well as the type of connection and network structure between non-IP devices and IP devices.

RUMP offers an efficient solution for IP or non-IP devices to access IGRS network, as it resolves the requirements of defining common system structure, port, message format and message flow to enable remote access of different RUMP devices (with strong or weak processing capabilities).

The specific protocol contents are as follows.

a) Remote universal device discovery and management framework:
   - connection methods and network architecture;
   - device configuration interfaces;
   - management message formats;
   - message exchange flows.