# ISO/IEC 14543-5-104

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# INTERNATIONAL STANDARD

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**Information technology – Home electronic system (HES) architecture – Part 5-104: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – RA server-based smart lock application**



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# CONTENTS

# INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

## Part 5-104: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – RA server-based smart lock application

## FOREWORD

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ISO/IEC 14543-5-104 has been prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology. It is an International Standard.

The text of this International Standard is based on the following documents:

| Draft | Report on voting |
|---|---|
| JTC1-SC25/3122/CDV | JTC1-SC25/3171/RVC |

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, available at www.iec.ch/members_experts/refdocs and www.iso.org/directives.

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 web site and ISO web site.

**IMPORTANT – The "colour inside" logo on the cover page of this document 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

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 (HES). 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 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, such as device and service discovery protocol, device and service description, service invocation and security mechanisms.
  - 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:
    a) ISO/IEC 14543-5-21: AV profile
    b) 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
  - Specifies 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 remotely accessing IGRS devices and services in the Home Electronic System. The remote access (RA) communications protocol and application profiles are specified in the following parts of ISO/IEC 14543-5:
  - ISO/IEC 14543-5-8: Remote access core protocol
  - ISO/IEC 14543-5-9: Remote access service platform
  - ISO/IEC 14543-5-101: Remote media access profile
  - ISO/IEC 14543-5-102: Remote universal management profile
  - ISO/IEC 14543-5-103: RA Smart audio interconnection profile
  - ISO/IEC 14543-5-104: RA server-based smart lock application
  - ISO/IEC 14543-5-105: RA server-based smart lock application test and verification (under development)

- ISO/IEC 14543-5-11: Remote user interface
- ISO/IEC 14543-5-12: Remote access test and verification
- ISO/IEC 14543-5-13: RA Smart home device control using voice recognition (under development)
- ISO/IEC 14543-5-141: Blockchain application protocols for HES based on IGRS RA specifications: core framework (under development)
- 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 14543-5-10#: Remote access application profiles

- Specifies a device and service interaction mechanism for various applications.
- Based on ISO/IEC 14543-5-8: Remote access core protocol.
- ISO/IEC 14543-5-101: Remote media access profile. This part specifies the common requirements for IGRS RA media users and devices in IGRS networks.
- 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.

Some of the profiles are under development, including:

- ISO/IEC 14543-5-103: RA smart audio interconnection profile. This part specifies the interoperability requirements for smart audio devices (audio devices with built-in computing and communication capabilities) and creates various application functionalities to enhance these audio devices. It introduces some new device types and specifies the mandatory device/service discovery, device control, content delivery and audio transcoding methods and interfaces, etc. to enable smart audio device interactions and content services.
- ISO/IEC 14543-5-104: RA server-based smart lock application. This part specifies a server-based smart lock application that utilizes the ISO/IEC 14543-5 series of standards for device interoperability. It specifies the required device interaction models, message formats and APIs and the authentication and security methods.
- ISO/IEC 14543-5-105: RA server-based smart lock application test and verification (under development). This part is the verification test specification for ISO/IEC 14543-5-104. It describes the required test cases and relevant pass/fail criteria to validate that a server-based smart lock device/application conforms to the ISO/IEC 14543-5 series of standard protocols (IGRS).
- 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

- Specifies a standard method to test and verify IGRS-RA compliant device and service interfaces.

– ISO/IEC 14543-5-13: RA smart home device control using voice recognition (under development)

  - Specifies the requirements to allow remote access and control of various smart home devices that use the same IGRS RA device interoperability protocols with a variety of voice recognition platforms. This part extends current IGRS RA device types to support the addition of voice recognition message format specifications. It introduces an IGRS RA voice-enabled gateway profile in compliance with the HES gateway (ISO/IEC 15045 series and ISO/IEC 18012 series) and the IGRS RA platform. It extends the HES environment to an external voice recognition service platform (“cross-platform” voice recognition interface platform) that includes specifications for universal voice recognition skill sets and translation interface service, platform security, IGRS RA (IGRS Remote Access Service Platform) message server API, and IGRS RA device control protocol parsing and status update service, etc.

– ISO/IEC 14543-5-14#: Blockchain application protocols for HES based on IGRS RA specifications (under development)

  - Specifies a blockchain application framework and profiles for various smart home HES applications.
  - Based on the ISO/IEC 14543-5-8: Remote access core protocol.
  - Some of the profiles are under development, including ISO/IEC 14543-5-141: Blockchain application protocols for HES based on the IGRS RA specifications: core framework. This is the first in a series of standards that specifies a blockchain application framework to enhance the HES architecture using IGRS RA protocols. Blockchain technology provides additional data storage protection and a trusted authentication mechanism that includes a secure data exchange process. This standard specifies the core framework requirements that establish a reference system architecture, interaction model, blockchain identity authentication, blockchain encryption-method requirements, generic data format template, RA server interface and configuration specification.

# INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

# Part 5-104: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – RA server-based smart lock application

## 1 Scope

This part of ISO/IEC 14543-5 specifies the remote access (RA) server-based application framework, device interaction model, flow process and interfaces, and message formats to achieve intelligent grouping, resource sharing and service collaboration among IGRS smart lock devices.

This document is applicable to smart lock devices with direct network connections or connections through an intermediary network to a server for security authentication. This server utilizes a method to minimize the possibility of unauthorized access to these smart locks, while maintaining seamless interoperability among users, smart lock devices and RA servers at home, office or other remote environments.

## 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 14543-5-8, *Information technology – Home Electronic System (HES) architecture – Part 5-8: Intelligent grouping and resource sharing for 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 Class 2 and Class 3 – Remote access service platform*

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 14543-5-8, ISO/IEC 14543-5-9 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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