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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

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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

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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 and ISO websites.

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.

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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. Some parts reference Classes 1, 2 and 3, which are HES designations specified in the HES architecture standard, ISO/IEC 14543-2-1.

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

– 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.
– 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:
    – Part 5-21: AV profile
    – Part 5-22: File profile
– 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.
– Part 5-4: Device validation
  - Defines a standard method to validate an IGRS-compliant device.
– Part 5-5: Device type
  - Specifies IGRS device types used in IGRS applications.
– Part 5-6: Service type
  - Specifies basic service types used in IGRS applications.
– 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:
    – ISO/IEC 14543-5-8: Remote access core protocol
    – ISO/IEC 14543-5-9: Remote access service platform
    – ISO/IEC 14543-5-101: Remote AV access profile
    – ISO/IEC 14543-5-102: Remote universal management profile
    – ISO/IEC 14543-5-11: Remote user interface
    – ISO/IEC 14543-5-12: Remote access test and verification
  - The relationships among these parts are specified in part 5-7.
– Part 5-8: Remote access core protocol

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- 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.

– 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

– Parts 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
  - Two profiles are under development:
    – Part 5-101: Remote AV access profile.[1] This part defines the common requirements for IGRS RA AV users or devices in IGRS networks.
    – Part 5-102: Remote universal management profile.[2] 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.

– Part 5-11: Remote user interface[3]
  - Specifies adaptive user interface generation and remote device control mechanisms suitable for different remote access applications and devices.

– Part 5-12: Remote access test and verification[4]
  - Defines a standard method to test and verify IGRS-RA compliant devices and service interfaces.

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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 CD 14543-5-102:2016.

3 Under preparation. Stage at the time of publication: ISO/IEC DIS 14543-5-11:2017.

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

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

1 Scope

This part of ISO/IEC 14543-5 specifies the basic functionalities, module structures and interfaces in an IGRS RA service platform (IRSP). The service interaction flow and the request/response message formats are also specified.

This document is applicable to remote access of an IGRS sub-network (called an IGRS subnet) for resource sharing and service collaboration among home and/or remote computers, consumer electronics and communication 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.

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IETF RFC 2818, *HTTP over TLS*

IETF RFC 4422, *Simple Authentication and Security Layer (SASL)*

IETF RFC 5246, *The Transport Layer Security (TLS) Protocol – Version 1.2*

IETF RFC 6121, *Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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
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 “#”.

3.1.4
device verification code
string used to examine if the user has the authority to bind a device

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

3.1.5
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.

3.1.6
IGRS RA device
physical device that is accessible to the IGRS RA user in the IGRS RA system

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Note 1 to entry: A binding relationship can be established between an IGRS RA device and an IGRS RA user. A sibling relationship can be established between two IGRS RA devices.

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3.1.7
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 the IGRS RA user and IGRS devices. It also provides re-transmission of collaborative messages. The IGRS RA user and device can start a data connection to the IRSP and supports interconnections using the data connection and re-transmission functions of the IRSP.

3.1.8
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.

3.1.9
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 should have 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.

3.1.10
message server
IGRS RA server that processes message exchanging logics (transmitting, receiving, forwarding and blocking, etc.)

3.1.11
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”.

3.1.12
user ID
unique identification of an IGRS RA user

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

Note 1 to entry: A user ID consists of a local part and a domain name part. A “@” is used to separate the two parts.

3.2 Abbreviated terms

AS	autonomous system
HTTP	hypertext transfer protocol
ID	identification
IGRS	intelligent grouping and resource sharing
IRSP	IGRS remote access service platform
RA	remote access
SHA	secure hash algorithm
SASL	simple authentication and security layer
TLS	transport layer security
XMPP	extensible messaging and presence protocol

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4 Conformance

A service platform conforming to this document shall be implemented as specified in Clauses 5 and 6. The message exchange mechanism in an IRSP conforming to this document shall be implemented as specified in Clause 8, and the security mechanism in an IRSP conforming to this document shall be implemented as specified in Clause 9.

5 IRSP overview

The IGRS remote access core protocol is specified in ISO/IEC 14543-5-8, which includes the relationship management between a user or device and a user or device, device discovery and online status management mechanism, message format, message exchange flow and remote access data/service distribution and sharing mechanism.

This document is based on the core protocol of ISO/IEC 14543-5-8 and specifies the service platform side of IGRS RA system structure, message formats and collaborative exchange flows between different servers in the IRSP.

The working scope of the IRSP protocol, the IGRS core protocol and interfaces between them are defined and shown in Figure 1.