



ISO/IEC 14543-5-6

Edition 1.0 2012-02

# INTERNATIONAL STANDARD

---

**Information technology – Home electronic system (HES) architecture –  
Part 5-6: Intelligent grouping and resource sharing for Class 2 and Class 3 –  
Service type**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 35.240.67

ISBN 978-2-8891-2900-3

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	8
3 Terms, definitions, abbreviations and conventions .....	8
3.1 Terms and definitions .....	8
3.2 Abbreviations .....	11
3.3 Conventions .....	11
4 Conformance.....	11
5 IGRS service overview .....	12
6 Definition of service type identifier.....	12
7 Standard service type list .....	13
8 Basic service type specification .....	15
8.1 Content index service.....	15
8.1.1 Overview .....	15
8.1.2 Content index service type .....	15
8.1.3 Content index service attribute .....	15
8.1.4 Data type of content index service.....	15
8.1.5 Invocation interface set of content index service.....	17
8.1.6 Content index service error code definition .....	26
8.2 Connection management service.....	26
8.2.1 Overview .....	26
8.2.2 Connection management service type .....	26
8.2.3 Reference flow of connection management service interface invocation.....	27
8.2.4 Connection management service attribute .....	27
8.2.5 Connection management service data type.....	28
8.2.6 Connection management service invocation interface set .....	28
8.2.7 Content management service error code definition .....	31
8.3 Media server transport management service .....	31
8.3.1 Overview .....	31
8.3.2 Media server transport management service type .....	31
8.3.3 Reference flow of media server transport management service interface invocation .....	31
8.3.4 Media server transport management service attribute.....	32
8.3.5 Media server transport management service data type .....	32
8.3.6 Media server transport management service invocation interface set.....	33
8.3.7 Media server transport management service error code definition.....	38
8.4 Media client transport management service.....	38
8.4.1 Overview .....	38
8.4.2 Media client transport management service type .....	39
8.4.3 Reference flow of media client transport management service interface invocation.....	39
8.4.4 Media client transport management service attribute .....	39
8.4.5 Media client transport management service data type.....	40

8.4.6	Media client transport management service invocation interface set .....	42
8.4.7	Media client transport management service error code definition .....	49
8.5	Rendering management service .....	49
8.5.1	Overview .....	49
8.5.2	Rendering management service type .....	49
8.5.3	Rendering management service attribute .....	49
8.5.4	Rendering management service data type .....	49
8.5.5	Rendering management service invocation interface set .....	50
8.5.6	Rendering management service error code definition .....	58
8.6	File access management service .....	58
8.6.1	Overview .....	58
8.6.2	File access management service type .....	58
8.6.3	Reference flow of FAMS interface invocation .....	59
8.6.4	File access management service attribute .....	60
8.6.5	File access management service data type .....	60
8.6.6	File access management service invocation interface set .....	61
8.6.7	File access management service error codes definition .....	72
8.7	File connection management service .....	72
8.7.1	Overview .....	72
8.7.2	File connection management service type .....	72
8.7.3	Reference flow of file connection management service interface invocation .....	73
8.7.4	File connection management service attribute .....	73
8.7.5	File connection management service data type .....	74
8.7.6	File connection management service invocation interface set .....	74
8.7.7	File connection management service error codes definition .....	76
9	Back channel message TCP service .....	76
9.1	Overview of Back channel message .....	76
9.2	Interaction flow of back channel message TCP service in audio/video playback application .....	77
9.3	Interaction flow of back channel message TCP service in an audio/video multicast playback application .....	77
9.4	BCM request message format definition .....	78
9.4.1	General .....	78
9.4.2	Connection management message .....	78
9.4.3	Content selection message .....	79
9.4.4	Transport control message .....	79
9.5	BCM response message format definition .....	80
	Annex A (normative) Content representation framework of an IGRS AV content directory .....	82
A.1	Overview .....	82
A.2	IGRS metadata specification .....	83
A.2.1	IGRS metadata definition .....	83
A.2.2	Metadata of item object .....	84
A.2.3	Metadata of container object .....	88
A.2.4	Interface for vendor defined metadata .....	92
A.2.5	Extension point for the next version's metadata definition .....	92
	Annex B (normative) Specific description of metadata definitions .....	94
B.1	Basic metadata of item objects .....	94

B.2	Metadata of a specific item object.....	99
B.3	Basic metadata of the container object.....	109
B.4	Metadata of specific container object.....	110
	Annex C (normative) Specific description of data type generation rules.....	114
C.1	Type_ObjectId.....	114
C.2	Type_ContentList.....	114
C.3	Type_FilterRule.....	115
C.4	Type_SortRule.....	115
C.5	Type_URI.....	116
C.6	Type_MediaFormat.....	116
C.7	Type_UserList.....	116
C.8	Type_ProtocolInfo.....	116
C.9	Type_MediaFormatList.....	117
C.10	Type_StorageMediumName.....	117
C.11	Type_TransportURI.....	117
C.12	Type_ItemList.....	118
C.13	Type_DisplayWindowInfo.....	118
C.14	Type_ObjectId in FAMS.....	119
C.15	ObjectType.....	119
	Annex D (normative) Service type message format.....	120
D.1	Universal message format for IGRS service invocation.....	120
D.2	Content index service.....	127
D.3	Connection management service.....	139
D.4	Media server transport management service.....	143
D.5	Media client transport management service.....	154
D.6	Rendering management service.....	167
D.7	File access management service.....	182
D.8	File connection management service.....	194
	Annex E (normative) IGRS XML schema files.....	197
E.1	igrs-cis-dt.xsd.....	197
E.2	igrs-cis-framework.xsd.....	197
E.3	igrs-cis-metadata-base.xsd.....	198
E.4	igrs-cis-metadata-container.xsd.....	200
E.5	igrs-cis-metadata-item.xsd.....	203
	Annex F (normative) Connection management service description.wsdl.....	211
	Annex G (normative) Content index service description.wsdl.....	217
	Annex H (normative) Media client transport management service description.wsdl.....	234
	Annex I (normative) Media server transport management service description.wsdl.....	251
	Annex J (normative) Rendering management service description.wsdl.....	265
	Annex K (informative) XML string example.....	285
	Bibliography.....	286
	Figure 1 – Connection establishment and release flow.....	27

Figure 2 – Transport control flow .....	31
Figure 3 – Transport control flow .....	39
Figure 4 – File access flow .....	59
Figure 5 – Connection establishment and release flow.....	73
Figure 6 – Interaction flow of back channel message TCP service in audio/video playback application .....	77
Figure 7 – Basic BCM request message format.....	78
Figure A.1 – An illustrative example of the structure of an IGRS content directory .....	82
Table 1 – Basic service type list.....	14
Table 2 – Service attribute of content index service .....	15
Table 3 – Data type of content index service.....	16
Table 4 – Service attribute of connection management service .....	27
Table 5 – Data type of connection management service.....	28
Table 6 – Service attribute of media server transport management service .....	32
Table 7 – Data type of media server transport management service .....	33
Table 8 – Service attribute of media client transport management service .....	39
Table 9 – Data type of media client transport management service .....	41
Table 10 – Service attribute of rendering management service .....	49
Table 11 – Data type of rendering management service.....	50
Table 12 – Service attribute list of file access management service .....	60
Table 13 – Data type of file access management service .....	61
Table 14 – Service attribute of file connection management service.....	73
Table 15 – Data type of file connection management service .....	74
Table 16 – Error definitions.....	81
Table D.1 – IGRS service invocation request message .....	120
Table D.2 – Service invocation response message .....	121
Table D.3 – Content directory object update notification message .....	122
Table D.4 – File/directory object update notification message .....	124
Table D.5 – Service attribute update notification message .....	126

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

### Part 5-6: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Service type

#### FOREWORD

- 1) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.
- 2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.
- 3) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO member bodies.
- 4) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 5) In order to promote international uniformity, IEC and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 6) ISO and IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC publication.
- 7) All users should ensure that they have the latest edition of this publication.
- 8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.
- 9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 10) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 14543-5-6 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

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.

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.

## INTRODUCTION

ISO/IEC 14543-5, Information technology – Home electronic system (HES) architecture – Part 5: Intelligent Grouping and Resource Sharing for HES (IGRS), consists of six parts:

➤ **IGRS Part 5-1: Core protocol**

- Specifies the TCP/IP protocol stack as the basis and the HTTP protocol as the message-exchanging 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 transport 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:
  - Part 5-21: AV profile
  - Part 5-22: File profile
- Additional application profiles are planned (part numbers to be assigned)
  - Part 5-2w: DVD profile
  - Part 5-2x: QoS profile
  - Part 5-2y: DMCP profile
  - Part 5-2z: Universal control 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.

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

### **Part 5-6: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Service type**

#### **1 Scope**

This part of ISO/IEC 14543-5 specifies the service types that conform to ISO/IEC 14543-5-1.

This part of the ISO/IEC 14543 is applicable to computers, household appliances and communication devices that implement media or data streaming in a local area network (LAN) or personal area network (PAN) environment by wired or wireless means.

#### **2 Normative references**

The following referenced documents are indispensable for the application 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 Class 2 and Class 3 – Core protocol*

ISO/IEC 14543-5-21,— *Information technology – Home electronic system (HES) architecture – Part 5-21: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Application profile – AV profile*

ISO/IEC 14543-5-22:2010, *Information technology – Home electronic system (HES) architecture – Part 5-22: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Application profile – File profile*

ISO/IEC 29341-3-1:2008, *Information technology – UPnP Device Architecture – Part 3-1: Audio Video Device Control Protocol – Audio Video Architecture*

IETF RFC 2046, *Multipurpose Internet Mail Extensions (MIME) – Part 2: Media Types*