INTERNATIONAL STANDARD

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Information technology – Home electronic system (HES) architecture –

Part 3-4: System management – Management procedures for network based control of HES Class 1

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FOREWORD

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EP 0817 423A1

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International Standard ISO/IEC 14543-3-4 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard is a product family standard. It shall be used in conjunction with ISO/IEC 14543-2-1, 14543-3-1, 14543-3-2, 14543-3-3, 14543-3-5, 14543-3-6 and 14543-3-7.

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 title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

The management procedures capture the dynamics of managing distributed resources on the network in terms of abstract procedures. On the network itself, a procedure consists of a sequence of telegrams, exchanged between two partners, the management client and the management server.

The management client is a powerful device with 'controller' function, typically, but not exclusively, PC-based. Except for network-oriented management, the server is always a 'target device'. In the former case, it is in fact the network as a whole which acts as partner or server. Ultimately, of course, the response to a client request is always generated by the individual devices connected to the network, either one or many. In addition to its run-time behaviour (based on group communication), every device moreover supports a rich management server profile for this purpose. An important objective of this part “Management Procedures” is to allow a concise description of such a profile. It is clear that the information about the full set of management procedures supported by a particular device or implementation tells us significantly more about the device than merely the list of services through which this is realised.

In general, one single device may well implement both client as well as server function. For and during the execution of a particular management procedure, however, one device takes on one single role.

Currently, ISO/IEC 14543, *Information technology – Home Electronic System (HES) architecture*, consists of the following parts:

Part 2-1: *Introduction and device modularity*
Part 3-1: *Communication layers – Application layer for network based control of HES Class 1*
Part 3-2: *Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1*
Part 3-3: *User process for network based control of HES Class 1*
Part 3-4: *System management – Management procedures for network based control of HES Class 1*
Part 3-5: *Media and media dependent layers – Power line for network based control of HES Class 1*
Part 3-6: *Media and media dependent layers – Twisted pair for network based control of HES Class 1*
Part 3-7: *Media and media dependent layers – Radio frequency for network based control of HES Class 1*
Part 4: *Home and building automation in a mixed-use building (technical report)*
Part 5-1: *Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Core protocol (under consideration)*
Part 5-2: *Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Device certification (under consideration)*

Additional parts may be added later.

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

Part 3-4: System management – Management procedures for network based control of HES Class 1

1 Scope

This part of ISO/IEC 14543 establishes general principles for network and device management shared by all installation modes for network based control of HES Class 1 and independent of the installation mode used. The aim is to standardize the interaction between a management client and a management server which leads to the successful configuration of the devices. The management procedures thus specify the highest level communication requirements between a management client and a management server. These requirements specify

a) the **sequence** of messages that shall be exchanged between a management client and a management server,

b) the **contents** and **interpretation** of the transported data,

c) the **action** to take based on this data (setting internal resources, state machines, physical actions, …), and

d) the error and exception handling.

The management procedures are based on the application layer services.

Some management procedures are solely based on the use of one or a sequence of dedicated application layer services to achieve the required goal. For these, ISO/IEC 14543-3-1 and ISO/IEC 14543-3-2 provide sufficient information concerning the underlying mechanisms.

Other management procedures additionally use the application layer services to access internal data in the management server to achieve the required goal. This data is defined as objects as specified in ISO/IEC 14543-3-3.

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 14543-2-1, *Information technology – Home electronic system (HES) architecture – Part 2-1: Introduction and device modularity*

ISO/IEC 14543-3-1, *Information technology – Home electronic system (HES) architecture – Part 3-1: Communication layers – Application layer for network based control of HES Class 1*

ISO/IEC 14543-3-2, *Information technology – Home electronic system (HES) architecture – Part 3-2: Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1*

ISO/IEC 14543-3-3, *Information technology – Home electronic system (HES) architecture – Part 3-3: User process for network based control of HES Class 1*

ISO/IEC 14543-3-5, *Information technology – Home electronic system (HES) architecture – Part 3-5: Media and media dependent layers – Power line for network based control of HES Class 1*

ISO/IEC 14543-3-6, *Information technology – Home electronic system (HES) architecture – Part 3-6: Media and media dependent layers – Twisted pair for network based control of HES Class 1*

ISO/IEC 14543-3-7, *Information technology – Home electronic system (HES) architecture – Part 3-7: Media and media dependent layers – Radio frequency for network based control of HES Class 1*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this International Standard the terms and definitions given in ISO/IEC 14543-2-1 and the following apply.

3.1.1
network
combination of several transmission links connected at individual points by electrical or optical means as part of an installation, system, appliance or component

3.1.2
bus access unit (BAU)
contains all protocol layers plus the optional internal user application

3.1.3
device
product
HES products consist of devices in the form of hardware, firmware and their associated software

3.1.4
management procedures
the dynamics of managing distributed resources on the network in terms of abstract procedures between two partners, the management client and the management server

3.1.5
management client
powerful device with 'controller' function, typically but not exclusively PC-based

3.1.6
management server
a particular device that acts as target device; except for network-oriented management, where the network as a whole acts as partner or server

3.1.7
network management
device-independent management procedures on the network as for example reading/writing the individual address and scanning the network. For these procedures no knowledge of the single devices is required

3.1.8
device management
procedures to access one specific device. These procedures describe for example the load procedures or reading the state. A detailed knowledge of the device is required for these procedures

3.1.9
communication mode
mode describing the relationship between communication points upon which the communication relies: one-to-many connectionless (multicast), one-to-all connectionless (broadcast), one-to-one connectionless, one-to-one connection-oriented

3.1.10
Group Address Table (GrAT)
shared resource of both the Link Layer and the group-oriented Transport Layer; used by the Link Layer as a look-up reference to check whether it should pass a received frame to the upper layers or not and used by the group-oriented Transport Layer to map an incoming LSAP (Group Address) to a TSAP in receiving direction and vice versa in sending direction

3.1.11
group object association table
resource of the Application Layer that stores the relationship between Transport Layer Service Access Points (TSAPs) and Application Layer Service Access Points (ASAP), as needed when mapping the Multicast Communication Mode messages A_GroupValue_Read and A_GroupValue_Write to T_Data_Group messages and vice versa

NOTE 1 The TSAP is an index in the Group Address Table. The ASAP is the Group Object number. The lowest ASAP is 0.

NOTE 2 The ASAP is a unique identifier for a group object to the Application Layer. Please also refer to the Application Layer specifications in ISO/IEC 14543-3-1. The ASAP is thus a group object number.

3.1.12
application program
element within an installed system (i.e. in a device) which performs information processing for a particular application and ensures the operations needed to execute the application

3.1.13
physical external interface (PEI)
physical and electrical interface situated in a device between the bus access unit and any hardware performing an application function

3.1.14
PEI type
physical and logical identifier of the configuration of the PEI to enable hardware compatibility recognition

3.1.15
external message interface (EMI)
collection of messages that together build a generic message interface to each protocol layer of a BAU and any application function

3.2 Abbreviations

ASAP	Application Layer Service Access Points
BAU	Bus Access Unit
DoA	Domain Address field in the frame
DoA_Device	Domain Addresses of the Device of which the individual address is read; it is contained in the response if the device is on Powerline
EMI	External Message Interface
GrAT	Group Address Table
IA	Individual Address of the sender
PEI	Physical External Interface
PPPP	Individual address of the device, in the response
RCo	Point-to-Point, Connection-oriented Communication Mode to a remote device
RCoV	Point-to-Point, Connection-oriented Communication Mode with verification to a remote device
RCl	Point-to-Point, Connectionless Communication Mode to a remote device
SA	Source Address of the sender
SN	Serial Number field in the frame
SN_Device	Serial Number of the Device of which the individual address is to be read
TL	Transport Layer
TSAPs	Transport Layer Service Access Points

4 Conformance

A management server conforming to this International Standard shall support all the network management procedures specified in clause 5 which contain the services it supports and all the device management procedures specified in clause 6 which contain the services it supports.

5 Network management procedures

5.1 General

The network management procedures describe the device-independent management procedures. These procedures shall be used to configure the network and to obtain information on the configuration of the network and connected devices.

For these procedures no knowledge of the single devices is required. They will work with every device connected to the network with the management server function implemented. Both management server and management client shall be based on the use of the dedicated application layer services which are specified in ISO/IEC 14543-3-1 for this purpose. Every individual management procedure below contains a dedicated subclause “Management services used” referencing, by name, the application layer services used. The procedures work independently of the location of the management client in the network. Some procedures require the previous configuration of routers and domain addresses via other procedures.