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Information technology - Home Electronic System (HES) architecture - Part 4-303: Application protocol for electric vehicle supply equipment (EVSE) chargers and controllers

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FOREWORD

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ISO/IEC 14543-4-303 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-SC25/3321/CDV	JTC1-SC25/3346A/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.

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.

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.

INTRODUCTION

The ISO/IEC 14543 series provides networking capability for a wide range of appliances, equipment, sensors, etc. in the home, including lighting, heating, and cooling. This part of ISO/IEC 14543 specifies the detailed procedures and behaviours of both electric vehicle supply equipment (EVSE) chargers and controllers at the application level of communications based on ISO/IEC 14543-4-3. This document specifies the message structure, sequences, and protocol of the application layer for networked enhanced control devices (NECDs) used in the Home Electronic System (HES). Some services are targeted for communications between devices. Other services are exclusively reserved for management purposes. Some services can be used for both management and run-time communications. This document is applicable for energy management services involving EVSE chargers and related devices.

Figure 1 shows the relationship between IEC 62394, ISO/IEC 14543-4-3 and ISO/IEC 14543-4-303. ISO/IEC 14543-4-3 specifies the message structure, sequences and protocol for general-purpose communications used in network enhanced control devices of the Home Electronic System (HES) Class 1. ISO/IEC 14543-4-3 provides the common interfaces for the use-level process and the services such as energy management, remote maintenance, and other services for easily building a system consisting of multi-vendor devices and equipment. IEC 62394 specifies the detailed lists of control commands on NECD objects (see ISO/IEC 14543-4-3). Annex A shows terms and NECD protocol frame format on ISO/IEC 14543-4-3 and IEC 62394.

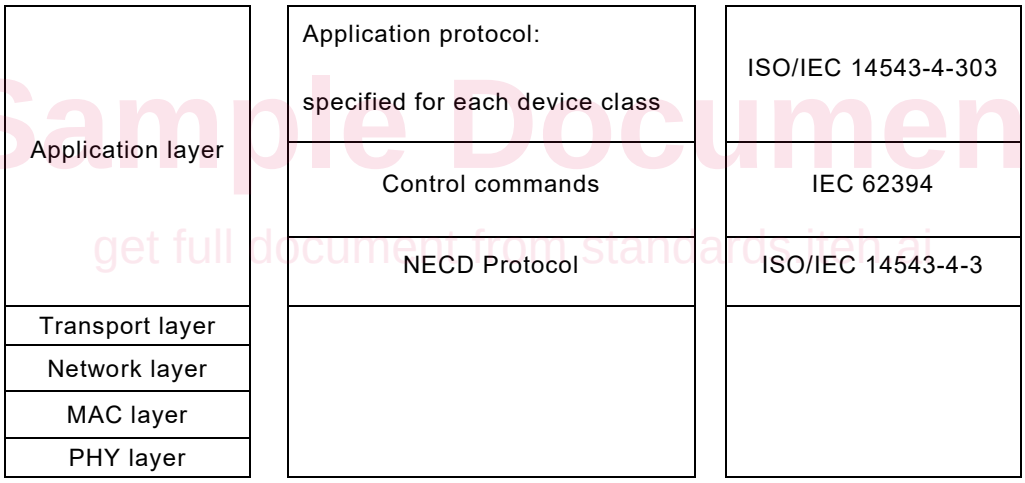

Figure 1 – Relationship between IEC 62394, ISO/IEC 14543-4-3, and ISO/IEC 14543-4-303

ISO/IEC 14543-4-3 is a general-purpose communications specification that applies to a variety of devices. ISO/IEC 14543-4-3 is the basis for this document, which specifies detailed procedures and behaviours for pre-packaged system solutions that include EVSE chargers and related devices. The procedures and behaviours specified in this document can be used for energy flow inside a home or energy flow between the grid and a home.

In order to enhance interoperability, it is important to specify how to implement ISO/IEC 14543-4-3 for each device and controller at the application level such as command sequences, timeout requirements, required combinations of acceptable commands, minimum subset of IEC 62394 properties, etc.

This document applies to the communication link in yellow between charging station (EVSE charger) and energy management system (EMS) as shown in Annex B.

For an EVSE that is capable of transferring electricity both from home or grid to EV and from EV to home or grid, see ISO/IEC 14543-4-304.

1 Scope

This part of ISO/IEC 14543 specifies an application-layer protocol important for ensuring interoperability among the products of various manufacturers regarding communications between electric vehicle supply equipment (EVSE) chargers and controllers. It uses the network enhanced communications device (NECD) protocol specified in ISO/IEC 14543-4-3. This protocol is based on UDP using IPv4 or IPv6 (TCP is optional).

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.

IEC 62394, *Service diagnostic interface for consumer electronics products and networks - Implementation for ECHONET*

ISO/IEC 14543-4-3, *Information technology - Home Electronic System (HES) architecture - Part 4-3: Application layer interface to lower communications layers for network enhanced control devices of HES Class 1*

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 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

3.1.1
controller
network enhanced control device (NECD) node that sends NECD requests (Get and SetC) to another NECD node

Note 1 to entry: A controller in this document can be used as a part of a customer energy manager (CEM) specified in IEC 63380-1.

Note 2 to entry: A controller in this document can be used with an energy management agent (EMA) specified in ISO/IEC 15067-3.

3.1.2
device object
network enhanced control device (NECD) object other than a node profile object

Note 1 to entry: In this document, "device object" refers to electric vehicle charger object only.

[SOURCE: ISO/IEC 14543-4-302:2023, 3.1.3, modified – In Note 1 to entry, "storage battery" has been replaced with "electric vehicle charger".]

3.1.3
electric vehicle
EV
vehicle that is powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source

Note 1 to entry: In this document, "electric vehicle" refers to both a vehicle that is only powered by an electric motor that draws electricity from a battery and a vehicle that is powered by an electric motor that draws electricity from a battery and by an internal combustion engine.

Note 2 to entry: In this document, "electric vehicle" refers to both a vehicle that contains a device that converts alternating current (AC) voltage to direct current (DC) voltage (e.g. inverter) and a vehicle that does not contain a device that converts AC voltage to DC voltage.

3.1.4
electric vehicle supply equipment
EVSE
device that transfers electricity between electric vehicle and home or grid

Note 1 to entry: In this document, "electric vehicle supply equipment" refers to both a device that contains a device that converts alternating current (AC) voltage to direct current (DC) voltage (e.g. inverter) and a device that does not contain a device that converts AC voltage to DC voltage.

Note 2 to entry: In this document, "electric vehicle supply equipment" refers to a device that supports primarily single-family residential applications.

3.1.5
electric vehicle supply equipment charger
EVSE charger
electric vehicle supply equipment that includes a communications interface of NECD protocol and is capable of managing the transfer of electricity from home or grid to electric vehicle (EV) and includes a communications interface to receive network enhanced control device (NECD) messages

Note 1 to entry: In this document, "electric vehicle supply equipment charger" refers primarily to an EVSE that is not capable of transferring electricity from an EV to home or grid using the NECD protocol.

3.1.6
NECD protocol
protocol used in network enhanced control device (NECD) communications

[SOURCE: ISO/IEC 14543-4-302:2023, 3.1.5]

3.1.7
node profile
description of objects implemented in each node

[SOURCE: ISO/IEC 14543-4-302:2023, 3.1.6]

3.1.8
remote control
control from outside the home

[SOURCE: ISO/IEC 14543-4-302:2023, 3.1.9]

3.1.9
response wait time
time between a controller request to an electric vehicle supply equipment (EVSE) charger and the response from an electric vehicle supply equipment charger