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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Information exchange for electric vehicle charging roaming service – Part 1: General

Échange d'informations pour le service d'itinérance de la recharge des véhicules électriques – Partie 1: Généralités

IEC 63119-1:2019-06(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INFORMATION EXCHANGE FOR ELECTRIC VEHICLE CHARGING ROAMING SERVICE –

Part 1: General

FOREWORD

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

FDIS	Report on voting
69/654/FDIS	69/659/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

A list of all parts in the IEC 63119 series, published under the general title *Information exchange for electric vehicle charging roaming service*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INFORMATION EXCHANGE FOR ELECTRIC VEHICLE CHARGING ROAMING SERVICE –

Part 1: General

1 Scope

This part of IEC 63119 establishes a basis for the other parts of IEC 63119, specifying the terms and definitions, general description of the system model, classification, information exchange and security mechanisms for roaming between EV charge service providers (CSPs), charging station operators (CSOs) and clearing house platforms through roaming endpoints. It provides an overview and describes the general requirements of the EV roaming service system.

IEC 63119 (all parts) is applicable to high-level communication involved in information exchange/interaction between different CSPs, as well as between a CSP and a CSO with or without a clearing house platform through the roaming endpoint.

IEC 63119 (all parts) does not specify the information exchange, either between the charging station (CS) and the charging station operator (CSO), or between the EV and the CS.

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.

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

3 Terms and definitions

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

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

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

3.1
electric vehicle
EV
electric road vehicle
vehicle propelled by an electric motor drawing current from a rechargeable storage battery or from other portable energy storage devices (rechargeable, using energy from a source off the vehicle such as a residential or public electric service), which is manufactured primarily for use on public streets, roads or highways

[SOURCE: IEC 61851-1:2017, 3.4.1, modified – The definition has been expanded.]

3.2
electric vehicle user
EV user
person or legal entity using the vehicle and providing information about its needs

[SOURCE: IEC TS 62913-2-4:2019, Table 3]

3.3
electric vehicle supply equipment
EVSE
equipment or a combination of equipment that provides dedicated functions to supply electric energy from a fixed electrical installation or supply network to an EV for the purpose of charging and discharging

Note 1 to entry: This note applies to the French language only.

3.4
charge service provider
CSP
role that manages and authenticates EV user's credentials and provides the billing and other value-added services to the customer

Note 1 to entry: A CSP is a specialized type of EMSP.

Note 2 to entry: This note applies to the French language only.

3.5
charging station operator
CSO
party responsible for the provisioning and operation of the charging infrastructure (including charging sites), and managing electricity to provide requested energy transfer services

Note 1 to entry: The party shall operate a roaming endpoint to achieve a roaming service.

Note 2 to entry: This note applies to the French language only.

3.6
EMSP
e-mobility service provider
party responsible for providing high-value service related to the use of an EV (renting an EV, reservation of parking service, navigation services, energy services which include charging station provider in relation with CSO…)

Note 1 to entry: This note applies to the French language only.

[SOURCE: IEC TS 62913-2-4:2019, Table 3]

3.7
roaming
information exchanges and related provisions between CSPs, which allow EV users to use a single credential and contract to access services on multiple e-mobility networks and contract to access the charging services provided by multiple CSPs or CSOs through roaming endpoints

3.8
clearing house
CH
mobility clearing house
MCH
roaming platform
e-mobility clearing house
E_MOCH
optional intermediate actor that facilitates authorization, billing and settling procedure for EV charging service roaming, between two clearing partners

Note 1 to entry: The terms "MCH" (mobility clearing house), "roaming platform" and "E_MOCH" (E-mobility clearing house) in different regions.

Note 2 to entry: This note applies to the French language only.

3.9
credential
physical or digital asset that carries the roaming service user's identity or contract ID, which is used for authentication and security purposes

EXAMPLES
- static or dynamic QR code;
- username/password;
- RFID card;
- digital certificate transferred through the plug and charge process.

3.10
service detail record
SDR
data package containing all necessary information within one unique identification which is needed for billing or informing of/about a service session of a specific customer

Note 1 to entry: This note applies to the French language only.

3.11
charging session
collection of charging transactions at a charge point related only to the charging of an electric car assigned to a specific customer in a specific timeframe with a unique identifier

Note 1 to entry: The charging session is a subset of the service session.

3.12
service session
collection of services around a charge point mainly related to the charging of an electric car assigned to a specific customer in a specific timeframe with a unique identifier

3.13
charging transaction
smallest billable part of a charging session representing the transfer of energy in a specific timeframe

3.14
roaming endpoint
RE
entity containing all the related roaming functions

Note 1 to entry: This note applies to the French language only.

3.15
charging station
CS
physical equipment consisting one or more EVSEs managing the energy transfer to and from EVs

Note 1 to entry: This note applies to the French language only.

3.16
energy transfer service
unit of continuous energy transfer between EVSE and EV battery

3.17
distribution system operator
DSO
party operating a distribution system.

Note 1 to entry: This note applies to the French language only.

[SOURCE: IEC 60050-617:2009, 617-02-10, modified – The terms "distribution network operator" and "distributor" have been deleted, and Note 1 to entry has been added.]

4 General description for roaming service models

4.1 General

The IEC 63119 series covers roaming-related communication exchange. Clause 4 specifies the general relationship of roaming with the relevant technologies.

Figure 1 shows an overview of roaming, grid and transportation technology. There could be other related technologies which are not presented in this chart. And not all interface reference points are plotted.

The information exchange of roaming focuses on actors between different CSPs, as well as between a CSP and CSO with or without clearing house platform through the roaming endpoint. The clearing house is an optional actor to complete the roaming functions, which can be completely or partially executed directly between different service providers.

For connections between grid and roaming technologies, there is a connection between the CSO and charging station. To implement the smart grid function, there could be other optional communication connections. For example, the distribution system operator may send the smart charging profile directly to the CSP.

For connections between roaming, grid and transportation technologies, it is also possible to have information exchange between the intelligent transportation system (ITS) and the roaming systems.

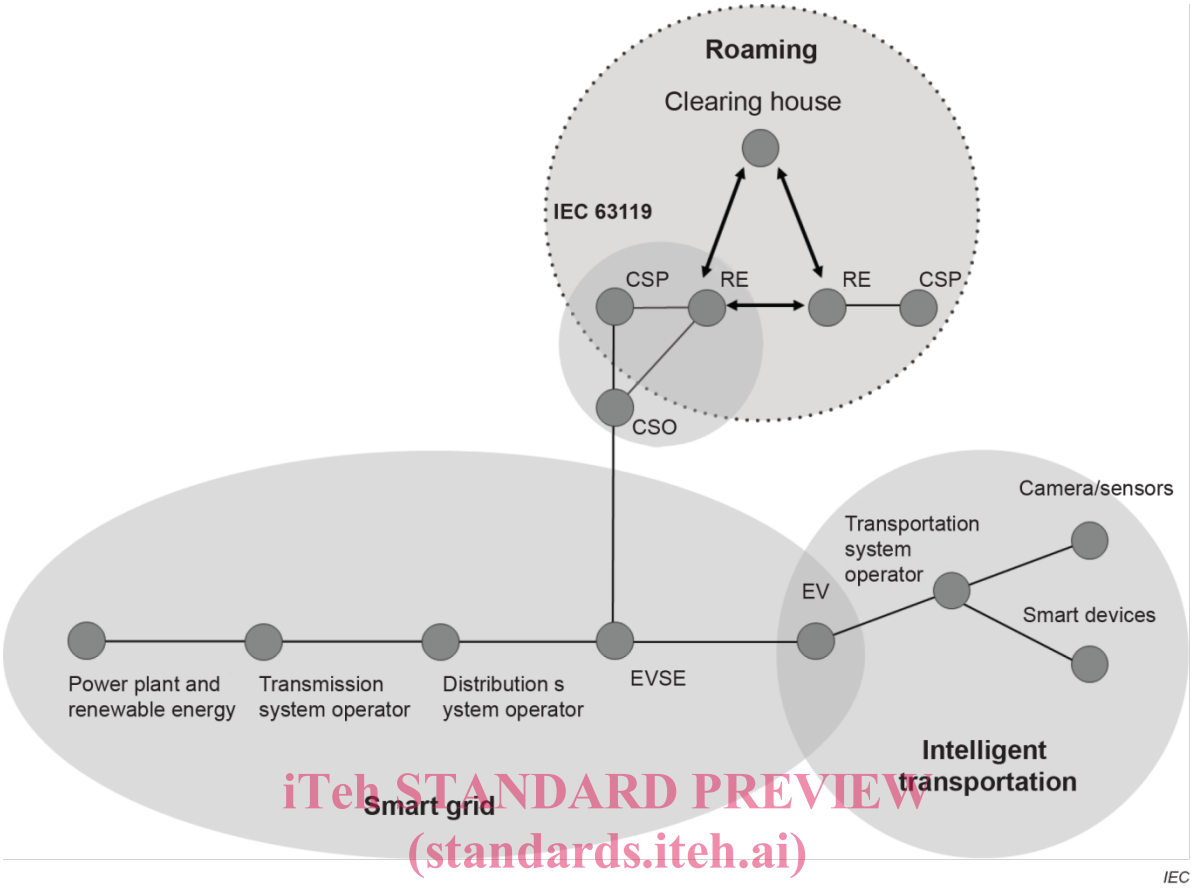

Figure 1 – Overview of roaming and relevant technologies

4.2 System architecture

Figure 2 shows an overview of the system architecture for EV roaming services. The basic actors and their related controllers and systems are as follows:

- Electric vehicle (EV): this normally includes a controller for external information flow, which negotiates and manages energy transfer between the EV and EVSE, exchanges EV and EVSE ID info, etc.
- EV supply equipment (EVSE): for networked EVSE, this normally includes a controller for charging communication, which negotiates and manages energy transfer between the EV and EVSE, exchanges EV and EVSE ID info, etc.
- Charging station operator (CSO): the CSO system manages the charging process of the EVSE and forwards charging session information to the charge service provider or roaming endpoint. A single entity can have both CSO and CSP roles.
- Charge service provider (CSP): for roaming services, both CSP and CSO may be involved through a roaming endpoint. For roaming between CSPs, the visited CSP collects metering data and charging session information from visited CSO, then creates a service detail record (SDR), and forwards the SDR to a home CSP through either a clearing house or directly.
- Clearing house (CH): the intermediate actor to facilitate EV charge roaming services. This role is not required, but can provide centralized service efficiency when there are many service providers. Each clearing house may have its own system for facilitating information exchange, billing and settlements.

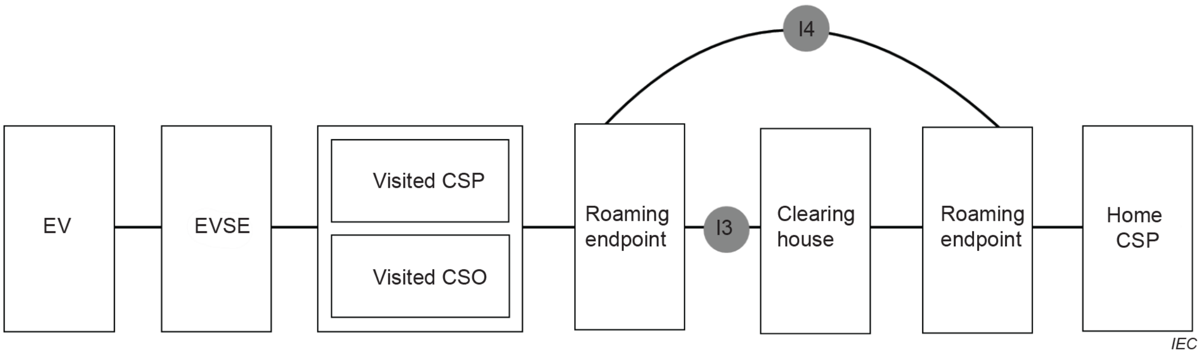

Figure 2 – Overview of system architecture

4.3 Communication interfaces

Figure 3 shows the primary actors, systems and communication interface reference points involved in the EV service.

- I1: Interface between EVSE and EV. The main functions include power supply management and charging session management.
- I2: Interface between EVSE and CSO. The functions supported by this interface can include credential authentication, EVSE charging status exchange, and charging session management.
- I3: Interface between roaming endpoint and clearing house. It specifies the EV roaming process through a centralized clearing house mode. The roaming functions can include credential authentication, EVSE charging status exchange, charging session remote control and management, and charging transaction billing and settlement.
- I4: Interface between two roaming endpoints. It specifies the EV roaming process through peer-to-peer direct mode. The roaming functions can include credential authentication, EVSE charging status exchange, charging session remote control and management, and charging transaction billing and settlement.
- I5: Interface for the transfer of user credentials through EVSE. Example credentials include RFID cards, credit cards or user/password inputs from station displays or a QR code displayed on a user device.
- I6: Interface for user credentials sent through a mobile app or other method to the CSP. Supported credentials include static or dynamic QR code, and username/password.
- I7: Interface between CSP and CSO. This can be an internal interface within one entity or an external interface between two entities.