

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Information exchange for electric vehicle charging roaming service –
Part 2: Use cases**

**Échange d'informations pour le service d'itinérance de la recharge des véhicules
électriques –
Partie 2: Cas d'utilisation**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2022 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

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

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Information exchange for electric vehicle charging roaming service –
Part 2: Use cases**

**Échange d'informations pour le service d'itinérance de la recharge des véhicules
électriques –
Partie 2: Cas d'utilisation**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 43.120

ISBN 978-2-8322-5829-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	8
4 Abbreviated terms	11
5 General requirements	11
5.1 General.....	11
5.2 System requirements	11
5.2.1 General	11
5.2.2 CSO system platform requirement	12
5.2.3 CSP platform system requirement.....	12
5.3 Communication requirements.....	12
5.4 Cybersecurity requirements	13
5.4.1 Data transmission security.....	13
5.4.2 Role identification	13
5.4.3 Information privacy protection.....	13
5.4.4 Information sharing principle.....	13
5.4.5 Encryption key usage and management.....	13
5.4.6 Agreement sharing principle	13
5.5 Unique identifier.....	13
5.5.1 Requirements of the unique identifier.....	13
5.5.2 Classification of the global ID	13
5.5.3 Definition of the global identifier	14
5.6 Identification method type	14
5.7 Session and transaction.....	15
5.7.1 General	15
5.7.2 Session	15
5.7.3 Transaction	15
5.7.4 Service session flowchart diagram.....	16
6 Architecture.....	17
6.1 System architecture	17
6.2 Actors and systems.....	18
6.2.1 Definition of actors.....	18
6.2.2 Systems actors	19
6.3 Roaming function domain.....	19
6.3.1 General	19
6.3.2 General information exchange	19
6.3.3 Tariff and pricing	19
6.3.4 Energy transfer management.....	19
6.3.5 Certification handling	20
6.3.6 Support functions.....	20
6.4 Clearing house function	20
6.4.1 Transaction hub switch	20
6.4.2 SDR reconciliation	21
6.4.3 Settlement	21
7 Use cases view	21

7.1	Use case hierarchy diagram.....	21
7.2	Use case hierarchy layer.....	22
7.2.1	Use case groups.....	23
7.2.2	Use case list.....	24
8	Use cases	26
8.1	General information exchange	26
8.1.1	UC1-1 Platform authentication.....	26
8.1.2	UC1-2 Sites information exchange.....	28
8.1.3	UC1-3 Sharing dynamic status of EV supply equipment.....	29
8.2	Tariff and pricing.....	30
8.2.1	UC2-1 Inform home-CSP on tariff information	30
8.2.2	UC2-2 home-CSP request tariffs from visited-CSO	31
8.3	Energy transfer management.....	31
8.3.1	UC3-1 Start charging roaming locally at the EV supply equipment.....	31
8.3.2	UC3-2 Start charging roaming remotely from home-CSP.....	33
8.3.3	UC3-3 Start charging roaming by PnC	35
8.3.4	UC3-4 Stop energy transfer session via home-CSP	37
8.3.5	UC3-5 Complete a charging service transaction in a roaming scenario	38
8.3.6	UC3-6 Collect dynamic charging information.....	38
8.3.7	UC3-7 Charge plan exchange.....	39
8.3.8	UC3-8 Reservation of an EV supply equipment.....	40
8.3.9	UC3-9 SDR information exchange	42
8.3.10	UC3-10 Update charge plan by visited-CSO	43
8.4	Credentials handling	43
8.4.1	UC4-1 Support online identification of the user at a visited-CSO.....	43
8.4.2	UC4-2 Pre-distribution of information for offline identification of the user at a visited-CSO	45
8.5	Supporting functions	45
8.5.1	UC5-1 Maintenance/outage information	45
8.5.2	UC5-2 Emergency cable unlocking after charging service activated.....	47
8.5.3	UC5-3 Emergency cable unlocking for charging service activation failed	48
Annex A	(informative) Roaming scenarios.....	50
A.1	Roaming scenario 1 – Roaming by using QR code scanning	50
A.1.1	Roaming scenario description.....	50
A.1.2	Roaming scenario business sequence diagram.....	51
A.1.3	List of elementary use cases	52
A.2	Roaming scenario 2 – Charging site navigation service.....	53
A.2.1	Roaming scenario description.....	53
A.2.2	Roaming scenario business sequence diagram.....	53
A.3	Roaming scenario 3 – Roaming by using RFID card.....	53
A.3.1	Roaming scenario description.....	53
A.3.2	List of elementary use cases	54
Annex B	(informative) Service session data	55
B.1	Service session data diagram	55
B.2	SDR general structure.....	56
Bibliography	57
Figure 5-1	– Service session structure	15

Figure 5-2 – Relationship between session and transaction	16
Figure 5-3 – Diagram of service session	17
Figure 6-1 – System architecture	18
Figure 6-2 – Clearing house function	20
Figure 6-3 – Clearing house.....	21
Figure 7-1 – Use case hierarchy diagram.....	22
Figure 7-2 – Use case hierarchy diagram of charging roaming	23
Figure 7-3 – Use domain overview of the 1-Layer in the hierarchy diagram	24
Figure 7-4 – Use case groups overview	24
Figure 8-1 – Use case sequence diagram for platform authentication.....	28
Figure 8-2 – Use case sequence diagram for Start charging roaming locally at the EV supply equipment.....	33
Figure 8-3 – Use case sequence diagram for Start charging roaming remotely from home-CSP	35
Figure 8-4 – Use case sequence diagram for Start charging roaming by PnC	37
Figure A.1.1 – Roaming by using QR code scanning.....	50
Figure A.1.2 – Sequence diagram	52
Figure A.2.1 – Charging site navigation service	53
Figure B.1 – Data diagram of service session	55
Table 1 – System actor categories	12
Table 2 – Structure of the global identifier.....	14
Table 3 – Definition of the global identifier syntax	14
Table 4 – Session categories	15
Table 5 – Definition of actors	18
Table 6 – Use case group index and description	23
Table 7 – Use case list	25
Table 8 – Use case description for platform authentication	26
Table 9 – Use case description for Sites information exchange.....	28
Table 10 – Use case description for sharing dynamic status of EV supply equipment.....	29
Table 11 – Use case description for Inform home-CSP on tariff information	30
Table 12 – Use case description for home-CSP request tariffs from visited-CSO	31
Table 13 – Use case description for Start charging roaming locally at the EV supply equipment.....	31
Table 14 – Use case description for Start charging roaming remotely from home-CSP.....	34
Table 15 – Use case description for Start charging roaming by PnC	36
Table 16 – Use case description for Stop energy transfer session via home-CSP	37
Table 17 – Use case description for Complete a charging service transaction in a roaming scenario	38
Table 18 – Use case description for Collect dynamic charging information.....	39
Table 19 – Use case description for Charge plan exchange	40
Table 20 – Use case description for Reservation of an EV supply equipment.....	40
Table 21 – Use case description for SDR information exchange	42
Table 22 – Use case description for Update charge plan by visited-CSO	43

Table 23 – Use case description for Support online identification of the user at a visited-CSO 44

Table 24 – Use case description for Pre-distribution of information for offline identification of the user at a visited-CSO 45

Table 25 – Use case description for Maintenance/outage information 46

Table 26 – Use case description for Emergency cable unlocking after charging service activated 47

Table 27 – Use case description for Emergency cable unlocking for charging service activation failed..... 48

Table A.1 – Roaming scenario: peer-to-peer roaming by scanning EV supply equipment QR code 51

Table A.2 – Elementary use cases 52

Table A.3 – Peer-to-peer roaming for charging service using RFID card 53

Table A.4 – Elementary use cases 54

Table B.1 – SDR general structure..... 56

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INFORMATION EXCHANGE FOR ELECTRIC
VEHICLE CHARGING ROAMING SERVICE –**
Part 2: Use cases**FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC 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 National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees 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, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) 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.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63119-2 has been prepared by IEC technical committee 69: Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks. It is an International Standard.

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

Draft	Report on voting
69/847/FDIS	69/862/RVD

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.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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 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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INFORMATION EXCHANGE FOR ELECTRIC VEHICLE CHARGING ROAMING SERVICE –

Part 2: Use cases

1 Scope

This part of IEC 63119 specifies roaming use cases of information exchange between EV charging service providers (CSP), charging station operators (CSOs) and clearing house platforms through roaming endpoints. The elementary use cases defined in this document are designed to support the user to have access to the EV supply equipment which does not belong to the home-CSP.

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 CSO with or without clearing house platform through the roaming endpoint.

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

IEC 63119-1, *Information exchange for electric vehicle charging roaming service – Part 1: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63119-1 and the following 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

service

series of processes that the service provider provides to the EV user, including energy transfer service, reservation service, parking service, etc.

3.2

energy transfer service

charging service

complete energy transfer process that the service provider provides to the EV user, including authentication, charging, billing, and settlement, for the time being