

Introduction to the types of roaming (including the roaming hub models and peer-to-peer model), the actors in the EV charging ecosystem, and what roaming means on a practical level for a charge point operator and a consumer



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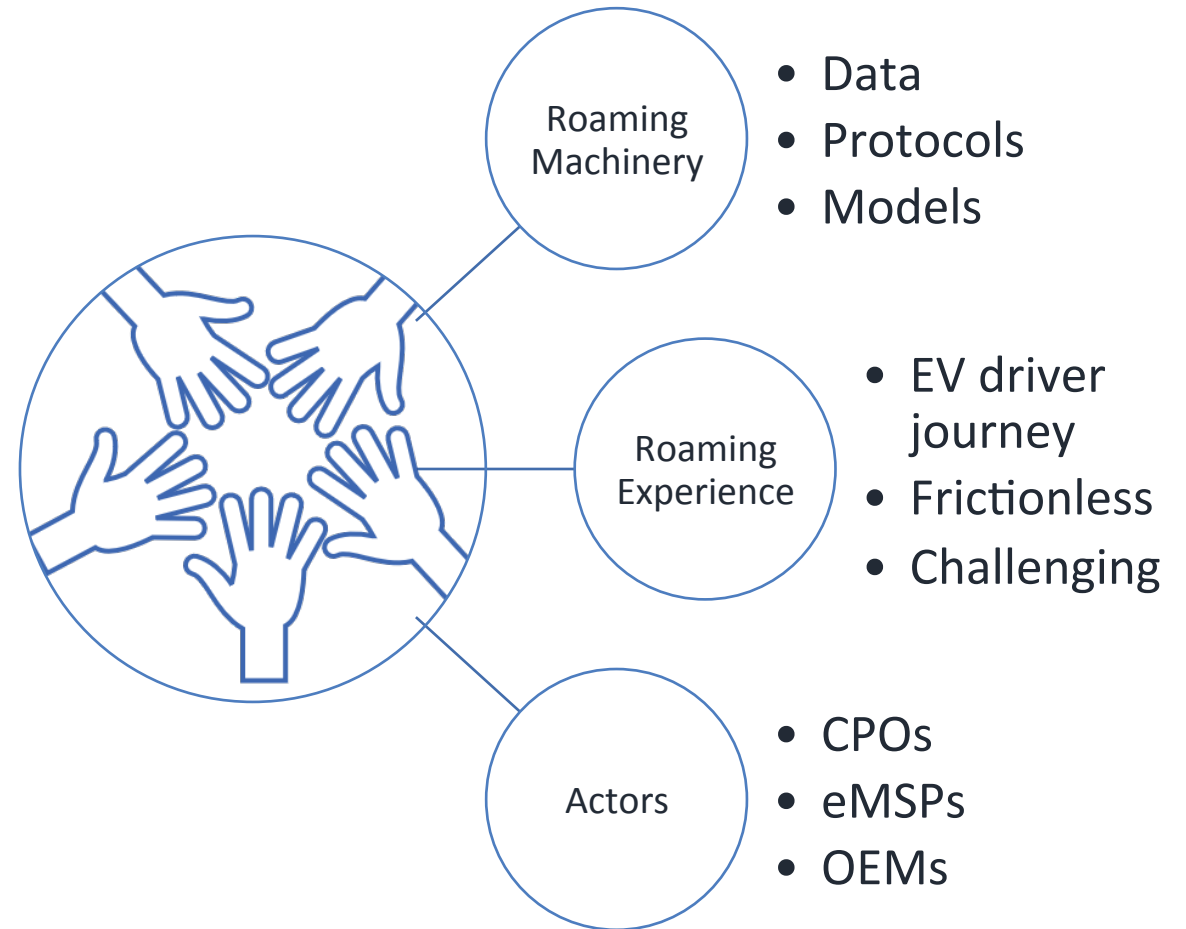
Overview

What does roaming mean?

What happens in the background?

How does roaming affect a charge point operator?

How does roaming affect a consumer?



Dispel the jargon



Adhoc: An interaction with a charger that requires no sign-up commitment



CPO: Charge Point Operator

An entity that operates charge points



eMSP: eMobility Service Provider

An entity that deals with EV drivers, added services such as billing etc.



Hub: a central connection point and roaming service provider

An entity that provides IT infrastructure that facilitates roaming connections



Protocol: a standard language for communication

A governed and agreed format for listing and sharing information



Model: a method adopted to achieve roaming



Roaming: 'roaming' from charger to charger with no hurdles



Peer to Peer (P2P): a bilateral agreement and direct connection between two entities

Access to kWhs

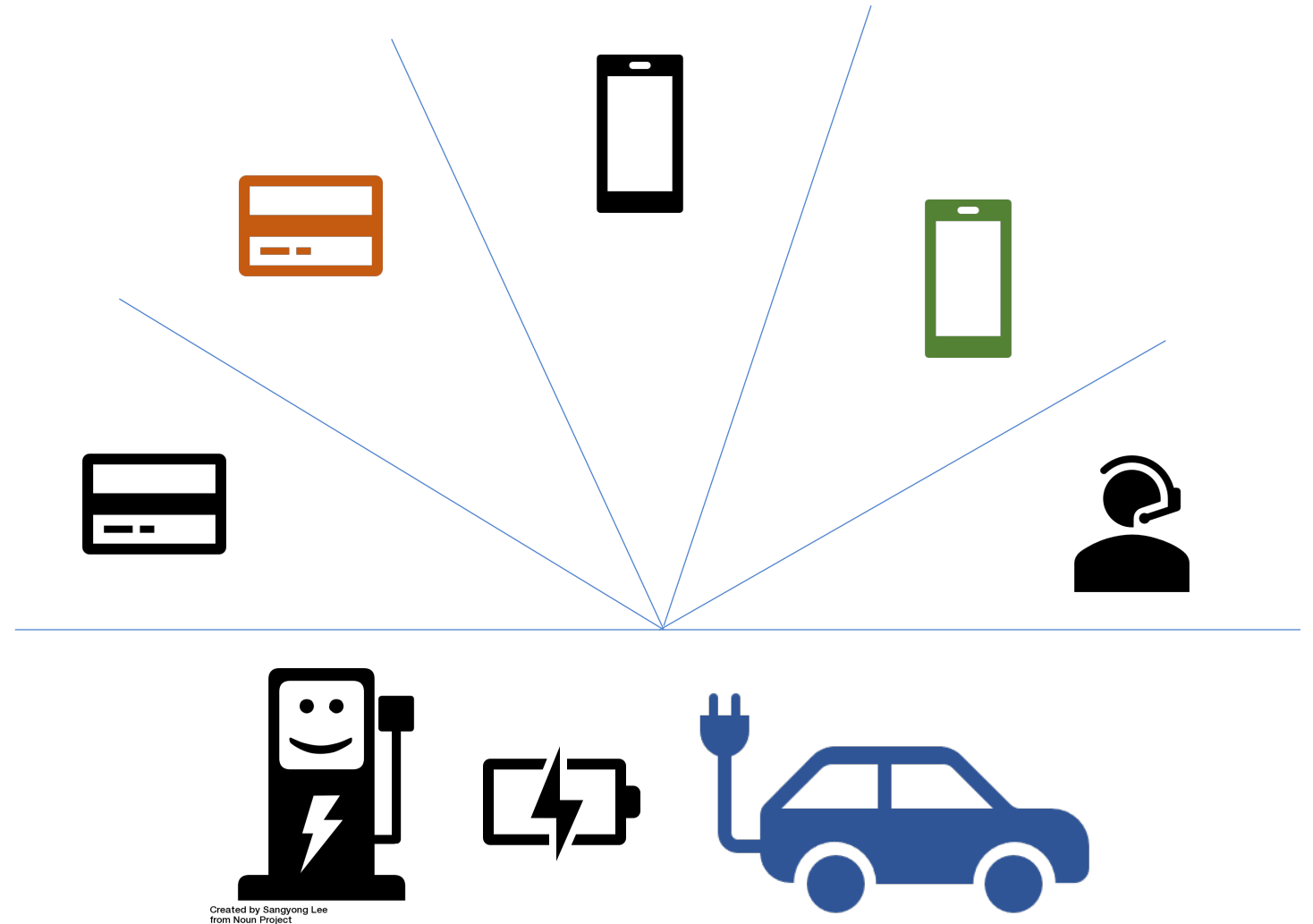
The only thing we are interested in is getting some energy into a vehicle and carrying on.

Currently this simple goal can be hard to achieve.

Multiple memberships are required.

There are multiple methods to get the charger going.

This is where roaming is required – to harmonise this challenge.



Created by Sangyong Lee
from Noun Project

Hub model

What is involved?

- An agreement between hub and CPO/eMSP
 - Protocol choice defined by hub
- Engagement with hub offerings

What happens?

- A single CPO/eMSP can now interact with multiple other entities based on one agreement

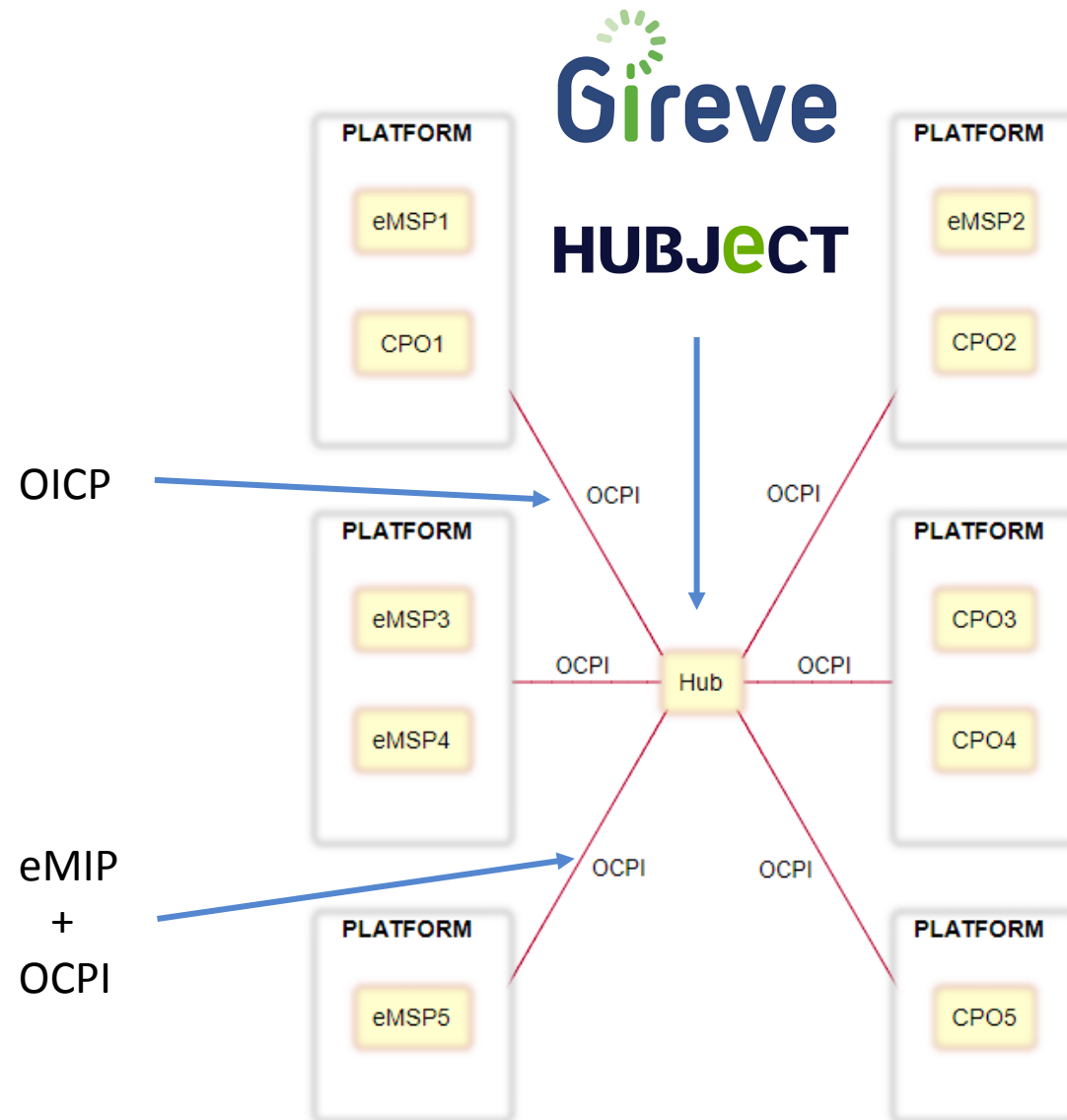


Figure 7. Platforms connected via a Hub topology example

<https://github.com/ocpi/ocpi/blob/master/topology.asciidoc>

P2P model

What is involved?

- An agreement between CPO/eMSP A and CPO/eMSP B
- Protocol choice
- Data swap

What happens?

- A single CPO/eMSP can now interact with another single CPO/eMSP only
- Manner of engagement can be very specific and bespoke

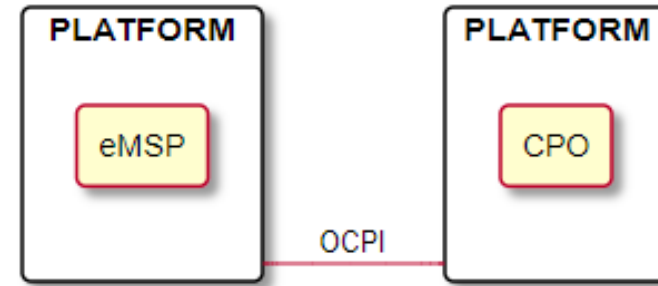


Figure 1. peer-to-peer topology example

<https://github.com/ocpi/ocpi/blob/master/topology.asciidoc>

Protocols

Why so significant?

Where all the chat is

Where the challenges are displayed

Where all the arguments are found

Where functionality is defined

Similar to speaking multiple languages, when you say 'good day' in French and when you say 'good day' in English to meaning is the same but the way you say it is totally different.

```
POST /api/emip HTTP/1.1
Content-Type: application/soap+xml; charset=UTF-8; action="https://api-
iop.gireve.com/services/eMIP_ToIOP_GetChargeDetailRecordV1/"
Content-Length: xxx

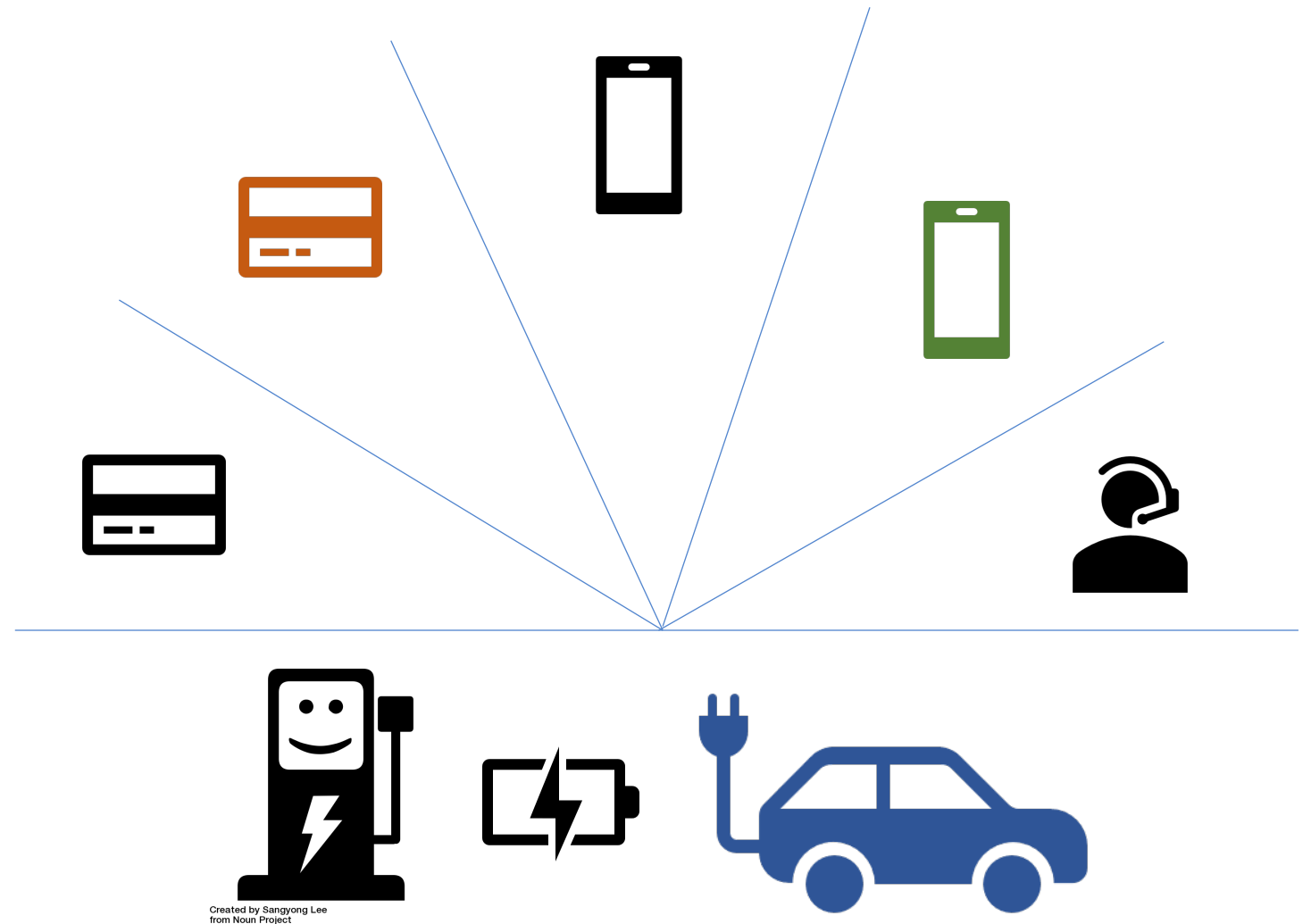
<?xml version="1.0"?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope">
<soap:Header />
<soap:Body xmlns:m="https://api-iop.gireve.com/schemas/AuthorisationV1/">
  <m:eMIP_ToIOP_GetChargeDetailRecordRequest>
    <transactionId>TRANSACTION_46151</transactionId>
    <partnerIdType>eMI3</partnerIdType>
    <partnerId>FR*MSP</partnerId>
    <operatorIdType>eMI3</operatorIdType>
    <operatorId>FR*798</operatorId>
    <serviceSessionId>IOP-SID-GIR-V-IOPFT01-
0dc6fc3...153e</serviceSessionId>
    <execPartnerSessionId>8798489</execPartnerSessionId>
    <salePartnerSessionId>8756546889</salePartnerSessionId>
  </m:eMIP_ToIOP_GetChargeDetailRecordRequest>
</soap:Body>
</soap:Envelope>
```

```
{
  "country_code": "BE",
  "party_id": "BEC",
  "id": "12345",
  "start_date_time": "2015-06-29T21:39:09Z",
  "end_date_time": "2015-06-29T23:37:32Z",
  "cdr_token": {
    "uid": "012345678",
    "type": "RFID",
    "contract_id": "DE8ACC12E46L89"
  },
  "auth_method": "WHITELIST",
  "cdr_location": {
    "id": "LOC1",
    "name": "Gent Zuid",
    "address": "F.Roosevelttlaan 3A",
    "city": "Gent",
    "postal_code": "9000",
    "country": "BEL",
    "coordinates": {
      "latitude": "3.729944",
      "longitude": "51.047599"
    }
  },
}
```

The message is about the same meaning:
A thing called a charge detail record,
Which is simply the details of a charging
session.
But they are laid out differently and
require different processing.

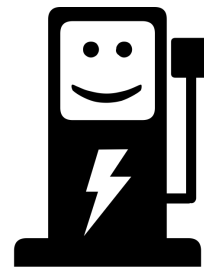
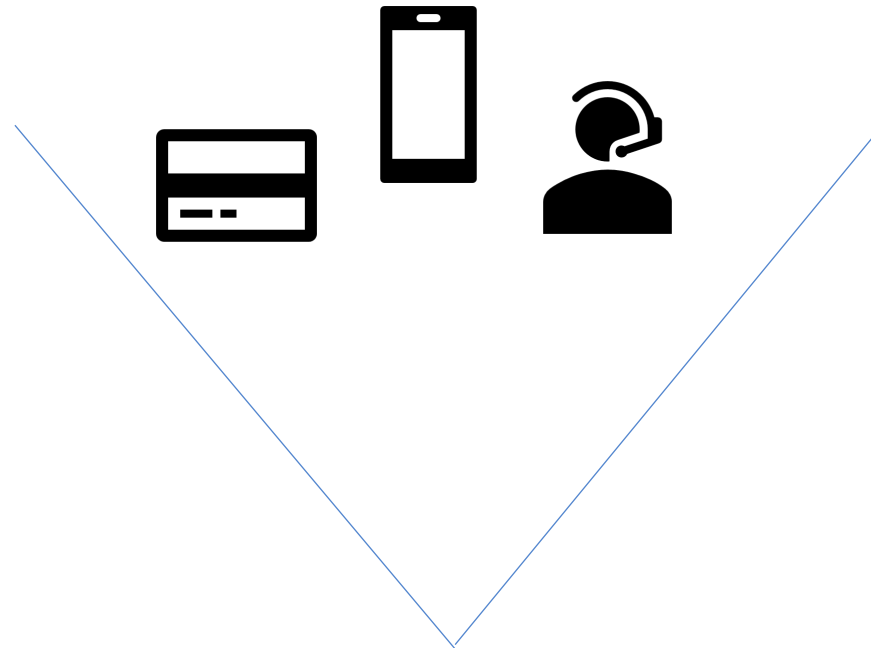
The same picture with roaming

There is one required commitment to a provider or,
There is no requirement at all
And it looks like the next slide



The same picture with roaming

There is one required commitment to a provider or,
There is no requirement at all



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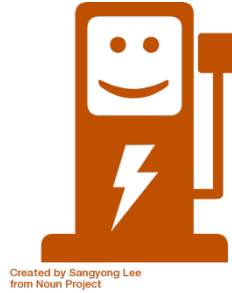
The dark side

There is a lot of complexity that happens in the background, even though the only real thing of interest is someone's identity and the information of how much money they spent.

For CPOs and eMSPs this can introduce challenges.



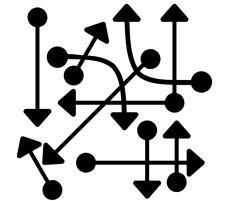
Data



Data



Data



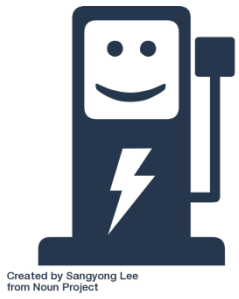
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Multiple reconciliation points to carry out.

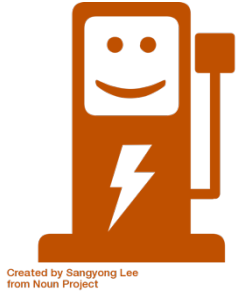
Added services

To overcome some of these overheads, hub services offer additional services to cover reconciliation.

However, for a small CPO or eMSP these can be too expensive to make use of.



Data



Data



Data



-
-
-



Some stats to close

The state of the charging market is very much dependent on utilization and therefore, to encourage this, roaming offers a method to improve the drivers experience and therefore, are more likely to use an EV.

Hubject has connected over 250 000 chargers to date

Gireve has connected over 75 000 chargers to date with 12 CPOs signed up in the UK

A new venture called Digital Charging Solutions has recently announced one of the largest roaming agreements in the UK offering one card for over 15 CPOs

A recent trend has been observed which shows an uptake in the implementation of OCPI, an open, free and P2P protocol.

A new blockchain powered version of the hub, or not hub, called the Open Charging Network is now available from the Share & Charge Foundation.

Finally a big thank you to the REA for organising this event!



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