

Lever the development of electrical mobility in Lyon



Development of widely available, easy to access, easy to subscribe charging infrastructure for electrical mobility is still a key challenge. We propose here some Use Case that may help to improve the situation. The common idea is to connect and operate in a decentralized way the many elements and actors of urban mobility, considered as a System of Systems.

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Key takeaways

Simplify UX. Better availability, easier payment

Enrich UX. Examples:

- Ensure charging for a specific chosen time period (at work, at night...)
- Optimize loading periods to relieve the grid (Car to Grid)
- Charging as a new service offered by smart car parks with optimization of the load according to the needs and behaviors of the users.
- Origin of the Energy used to charge a vehicle, incl.C02 footprints estimates
- ...

« Make It Secure Stupid»: Security, ID management, Confidentiality for Privacy and Commercial data, assessment of environmental and societal impacts are key concerns for all SP&SC Use Cases.

EMSP ?

EMobility Service Provider

An Emobility Service Provider (EMSP) is a company offering an EV charging service to EV drivers. An EMSP provides value by enabling access to a variety of charging points around a geographic area. EMSPs help EV drivers find charging stations, start charging events and pay with various methods. Typically EMSPs serve registered customers but may also enable access for unregistered users.

Together with a **Charge Point Operator** service, an EMSP may focus on enabling access to the company's own charging stations.

As a separate service EMSPs may also provide access to 3rd party charging stations through roaming. In these cases the company, e.g. an energy utility, typically offers the service to an existing customer base.

CPO ?

Charge Point Operators

A Charge Point Operator (CPO) is a company operating a pool of charging points. Sometimes an Operator owns infrastructure, sometimes it just provides Owners the connection, or sometimes it can both own infrastructure and provide access to other Owners.

A CPO makes sure the network works smoothly. This can include diagnostics, maintenance, price setting and POI data management.

Even if the CPO company offers also an EMSP service, they might want to allow access to the charging points also from other EMSPs.

As a separate service, CPOs rely on other EMSPs to provide access to their charging stations. This can be enabled for example through roaming networks.

Use Case SC 1: Substitution to direct payment of the charge for non-subscribed user

EV users have to be able to park and leave without worrying about loading conditions, ownership of the charging station, subscription....

Use Case context:

On public EV charging stations, existing solutions allow a non-subscribed user to pay a charge by credit bank card through a dedicated webpage or the Izivia application. This is a unit purchase.

Use Case expectation:

Easier, reliable and secured payment solution using blockchain.

More robustness in case of bad or lost communication of the EV charging point : an alternative based on local identification between the user and the charging point must be designed.

Upgradable solution in order to integrate contactless payment solution, QR Codes or other means.

Use Case SC 2: Transactions between EMSP (E-mobility Service Providers)

Roaming for e-mobility

Use Case context:

When the Electric Vehicle user's EMSP (E-mobility Service Provider) is not the CPO, there is two ways to make the connection between EMSPs and the CPO : first through an interoperability platform which contracts with EMSPs on the basis of pre-negotiated tariffs for interoperability or through direct transactions between EMSPs with a bi-lateral negotiated price.

Which alternative technical solution could be implemented using blockchain to make Electric Vehicle charging interoperability without third party centralized platform ?

Use Case expectation:

Charging transactions over blockchain

Blockchain payments with smartcontracts between EMSPs and CPO

Open access to smartcontracts plaform for EMSPs



Use Case SC 3: Certification of “green electricity origin”

Use Case context:

With the deployment of the renewable energy, more and more consumers pay attention to the green origin of the electricity.

“Green electricity” is produced by renewables sources (solar, wind, hydraulic, ...).

At the injection point the green electricity quantity can be measured, with high accuracy.

However, after injection in the grid it is no more possible to identify the origin of the electrons !

Use Case expectation:

A certificate solution to guarantee the origin of electricity purchase for a consumer which also implement time stamp to insure simultaneity of the production and the consumption.

Use Cases SC 1, 2 & 3

Hardware for UX: Laptop, Smartphone, Vehicular communication system...

Digital assets

The Open Charging Network client is written in Kotlin (JVM)

All other software provided are written in Typescript/Javascript (NodeJS).

Knowledge of these languages might be a plus in order to debug or modify software to fit the use cases of the hackathon.

Otherwise, usage of the software provided can largely be achieved by making HTTP API requests, with the exception of interacting with smart contracts.

The open source repositories can be found here : <https://bitbucket.org/shareandcharge/>

People/skills

Developers for blockchain platform programming

Developers web back-end (front-end experience is obviously a plus if the need to build user interfaces during the hackathon arises)

Use Cases Smart Parking

Common takeaways for Smart Parking Use Cases

Objectives

Increase available parking space (Average of 1 place for 3 dwellings in some districts) and charging points,
Clean air and decarbonization of the city
Facilitate multimodal transportation

Ideas

Mutualization of private / public parking spaces
Development of new mobility behaviors through incentivization, nudge, gamification
Shared car pools
...

Solutions

A decentralized platform that shares key information and manages transactions.
A platform accessible by smartphone and website.
A platform that aggregates and communicates information from or to other platforms, eg public services, mobility and service providers...
...

Use Case SP 1: Incentives for car drivers entering into Lyon Urban Area

Car owners complying with some behavior (car-sharing, use of relay park ..) may be allowed to benefit of priority emplacements, better prices for park rate and/or electric charging.

A personal payment support (Pass Urbain) deployed for all inhabitants in the urban area could permit to take into account their personal situation (revenues, family...).

Pain point: how to guarantee that the behavior recorded is the real behavior ?

Use Case SP 2: Access to a private park place with charging facilities.

Inhabitants can give access to their park place or garage and provide electric charging in exchange of some advantages (free park place in Lyon for instance).

This service may also optimize parking managers revenues by increasing the occupancy rate

Pain point: how to estimate the value of the service and energy provided ?

Use Case SP 3: Smart Parking/Charging to mutualize park places

All available park places (public and private) could be made available and mutualized, through a smart system allowing to take into account the user behavior (time needed, arrival time, type of vehicle ...).

The payment could be made through a “Pass Urbain”, taking into account user needs and revenues.

Pain point: how to guarantee that the park places will not be monopolized by “stuck cars” or sub rentals” ?

Use Case SP 4 : Car sharing

Some public services operate a large pool of vehicles.

They could rent those which are not used during the week-end for instance. This service, could take into account user needs and revenues.

Pain point: how to avoid the side effects of a “Air BnB” of car sharing ?