Interoperability and the challenge of unrestricted access to the EV charging infrastructure

A state of the art

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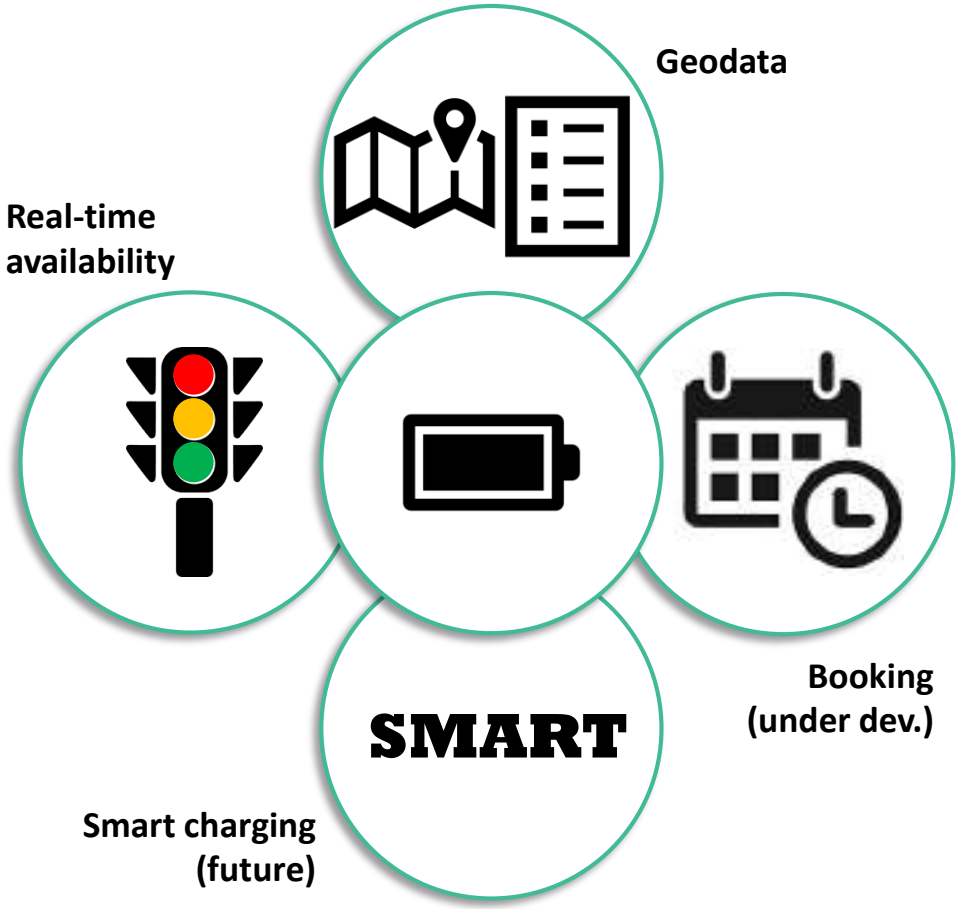
Co-financed by the European Union
Connecting Europe Facility

Introduction:
EV charging interoperability: a global concern

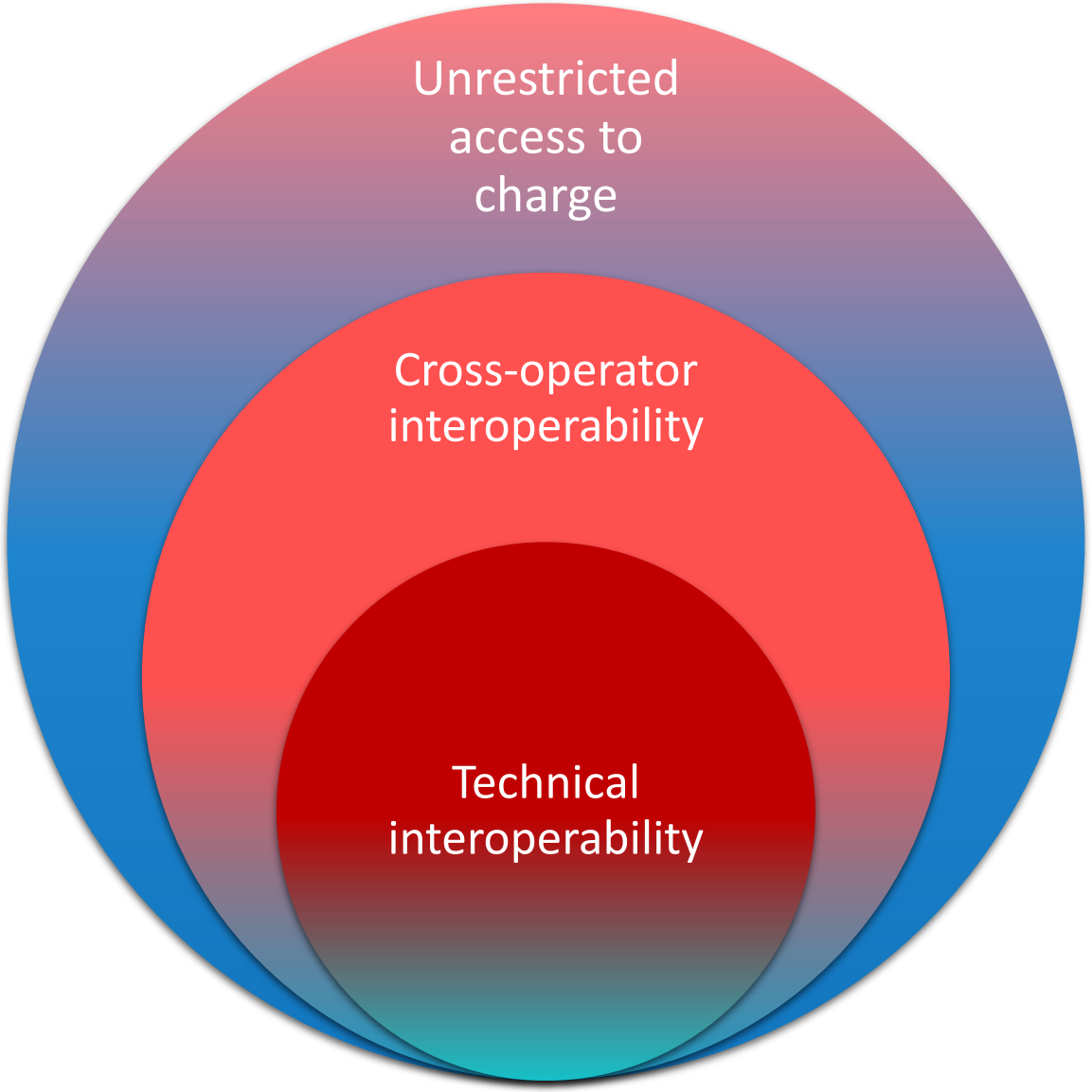
- A **watchword:** favour the uptake of the electromobility market.
- Overall goal: provide **easy & unrestricted access** to the charging infrastructures.
- Operational solutions: still **under development** and arouse **debates**.
- We will examine **3 of them**:
  - "ad hoc access"
  - cross-operator roaming via eRoaming platforms
  - cross-operator roaming basing on standardised P2P connections (OCPI protocol)
- *Based on a **review of expert reports** and **interviews** with players of the electromobility ecosystem*

Context:
Towards an electromobility market of services



- Charging as a package of services
- Promotion of contract-based schemes to enable high value-added services
- Dedicated roles among the market players (CPO, EMP, etc.)
- Sponsored by the industry, backed by the EC (SGEMS, Memorandum of Understanding)

Part 1: 3 nested perspectives around interoperability

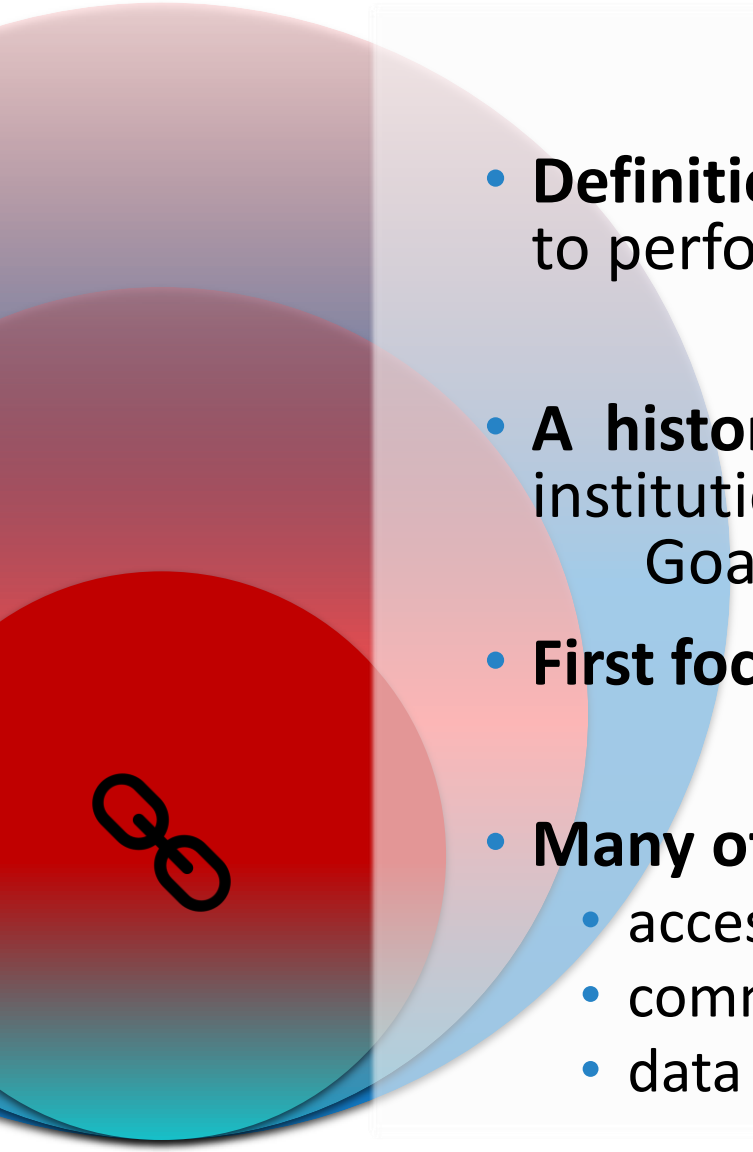


Stress put on all customers

Stress put on the operators

Stress put on the technical systems

Part 1: 3 nested perspectives around interoperability



Technical interoperability:

- **Definition:** Ability of different technical systems to work together, to perform required functions: vehicle/charger/backend/access means.

  ➡ Standardised interfaces

- **A historical concern** from both the industry and the European institutions.

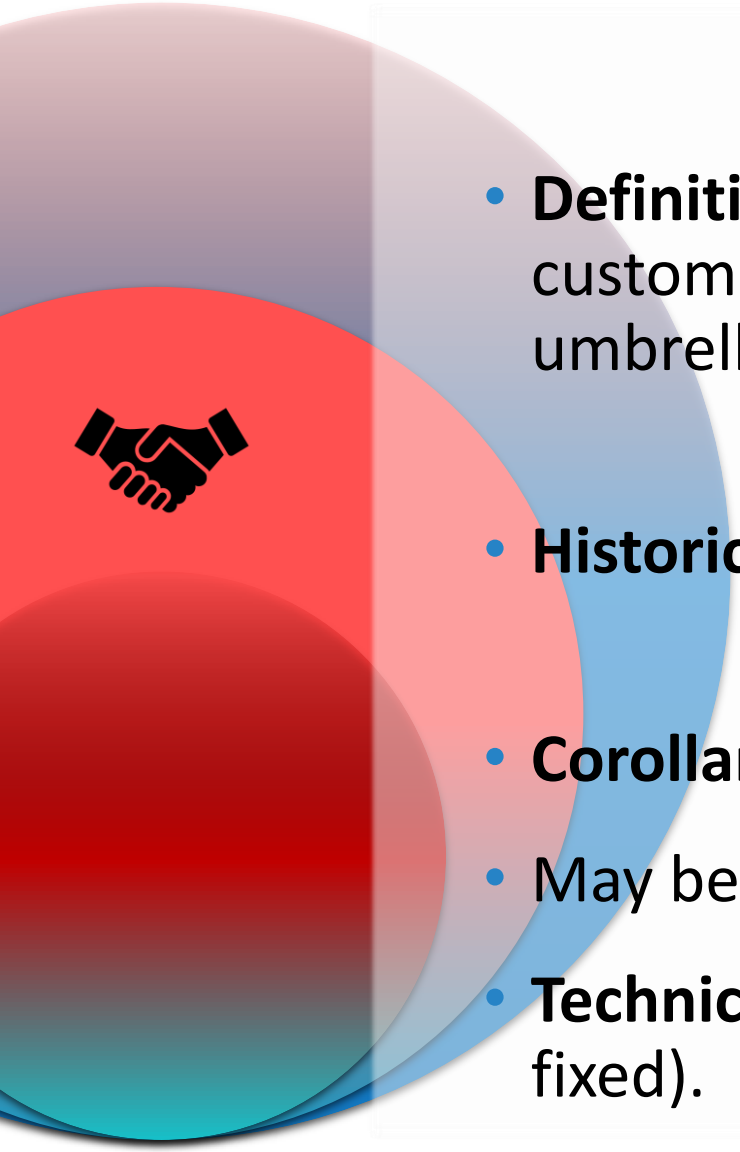
  Goal: prevent market borders and obstacles to eMobility.

- **First focused on charging interfaces**, especially plugs

  ➡ Sorted out by the Directive 2014/94/EU AFI

- **Many other issues under examination:** harmonisation of
  - access interfaces (e.g. RFID cards and readers)
  - communication protocols (e.g. OCPP within the OCA)
  - data formats and IDs (by the eMI^3 group).

Part 1: 3 nested perspectives around interoperability



Cross-operator interoperability

- **Definition:** ability of an EMP to deliver its own services to its customers, using the infrastructure of any CPO, under the umbrella of a B2B relationship.

  ➡ eRoaming

- **Historical reasons:** market fragmentation, island solutions.

  ➡ « need to manage interoperability »

- **Corollary of the support to subscription-based access**.
- May be **centralized** (hubs) or **distributed** (P2P).
- **Technical aspects** and **business aspects** (more complex to be fixed).

Part 1: 3 nested perspectives around interoperability

Unrestricted access to charge

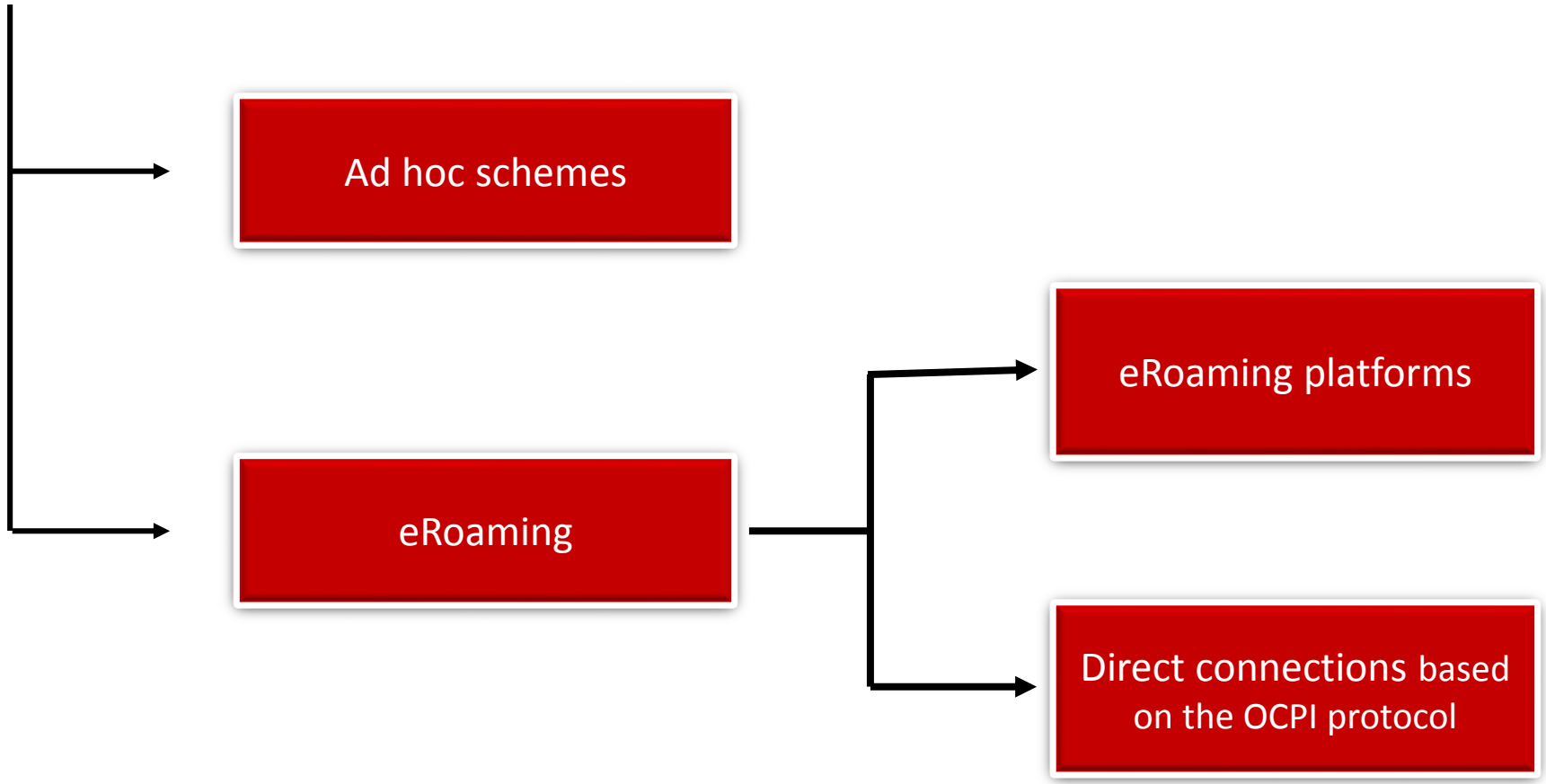
- The stress is put on **ALL customers**.
- Introduction of the **ad hoc functionality** within the directive 2014/94/EU on the development of alternative fuels infrastructure = charging without contract.
- Ad hoc regarded as an interoperable access means (SGEMS experts).

Part 1: 3 nested perspectives around interoperability

Unrestricted access to charge

- **Definition:** ability for a customer to use the charging infrastructure
  - ✓ wherever it is located
  - ✓ whichever EV he drives
  - ✓ whoever operates the charge point
  - ✓ whether he has subscribed to a charging contract or not
  - ✓ using no extra access and payment means that those he already possesses/which are commonly used

Part 2: 3 options to answer the challenge of unrestricted access to charge



Part 2: Option #1 ad hoc access

Main features

Directive 2014/94/EU on the development of Alternative Fuels Infrastructure

An under-developed option in Europe…
(5% of the charge points in 2016)

… **bound to develop** thanks to the transposition of the directive in the national regulatory frameworks.

e.g.: IT: mandatory since 2016; FR: mandatory since Jan. 2017

Market players are gradually including ad hoc access in their offer.

Requested by some Member States as the simplest option to ensure access

Article 4.9

« possibility for electric vehicle users to recharge on an ad hoc basis **without entering into a contract** ».

Alternative terminologies in use across Europe

direct payment, fee for service, one-time payment, pay as you go

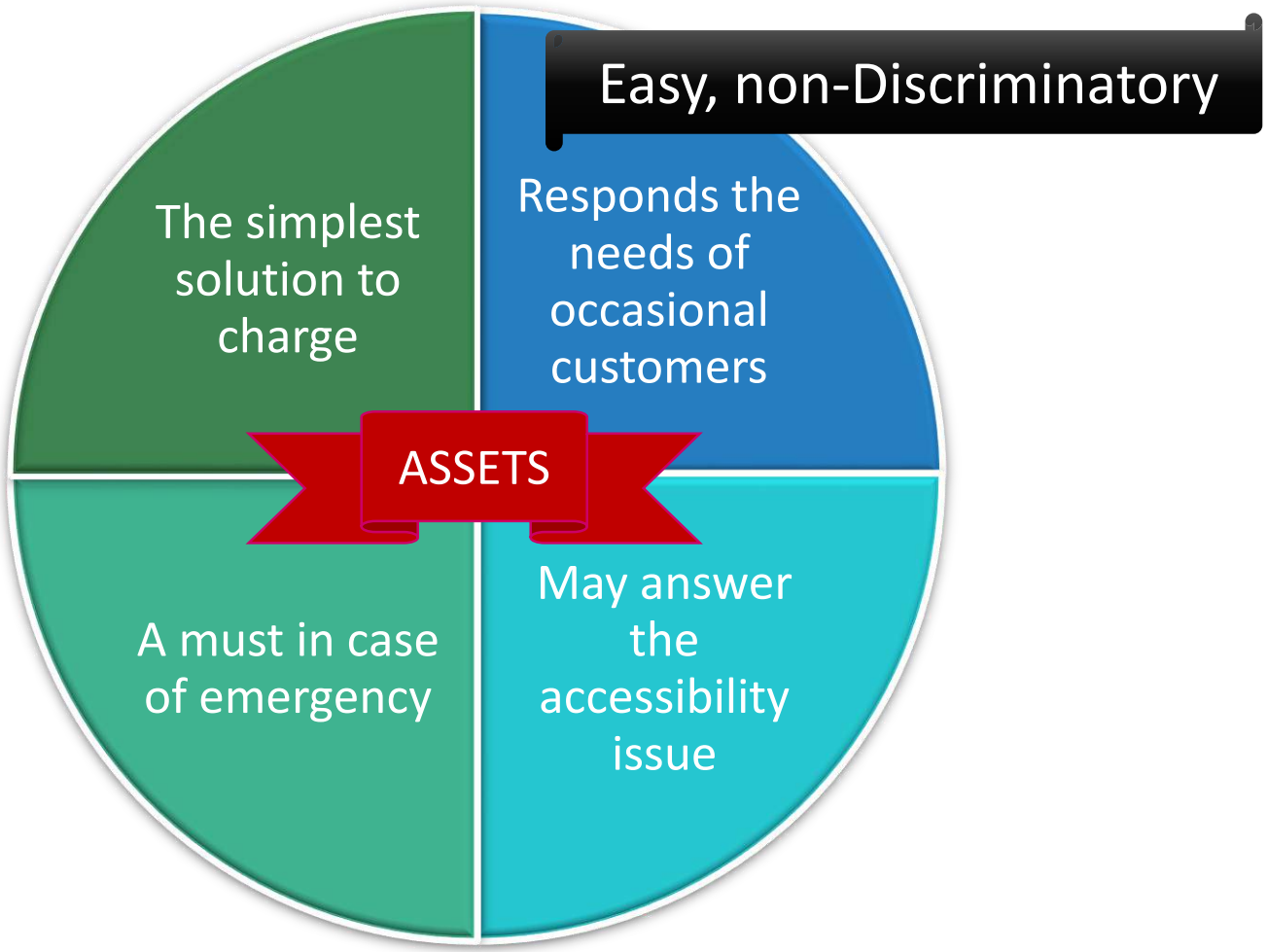
Different technical solutions

Local solutions:
- ✓ Credit card reader
- ✓ Prepaid RFID card
- ✓ Stationary, with manual release

Remote solutions:
- ✓SMS
- ✓ Mobile website
- ✓ App/Global app
- ✓ IVR/call center

Part 2: Option #1 ad hoc access

Assessment of the solution by the ecosystem



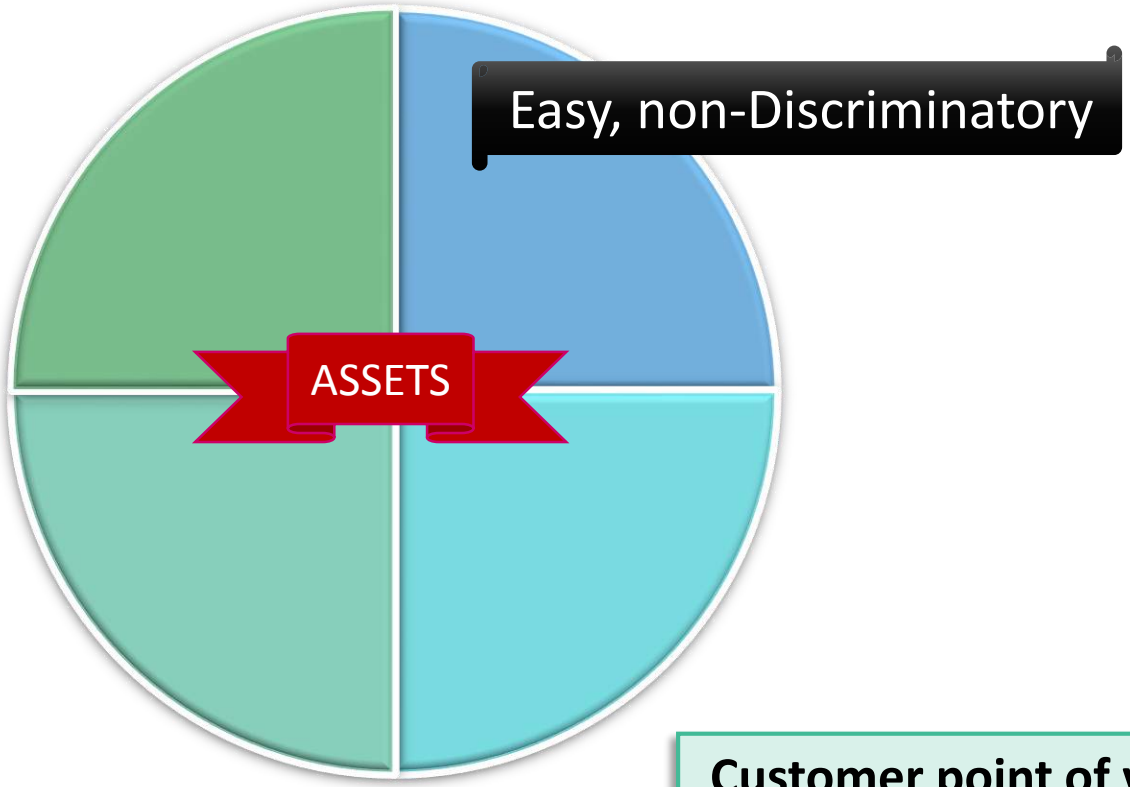
Part 2: Option #1 ad hoc access

LIMITS

Operator point of view:

Reduced possibility to make a business

- No information on the customers
- No possibility to provide packaged offers and value-added services (booking, smart charging)



Assessment of the solution by the ecosystem

Customer point of view:

- Lower quality of the service
- Higher prices

LIMITS

Part 2: Option #1 ad hoc access

Open issues

The way ad hoc should be implemented is still debated

- Need to define more precisely ad hoc charging
- 2 principles:
  - promote methods which are both customer friendly and cost effective
  - implement methods which can also be used by foreigners (e.g. no SMS)

Examples

Credit card readers: potential option or to be avoided?

- Hardware and operational costs; default rate; uneven use of CC in Europe; competed by digital access methods enabling CC payment.
- Need of feedbacks based on actual implementation + feedbacks from users to have a clearer idea

What would be a customer-friendly ad hoc access?

- customer friendliness of digital options in question (downloading, need of good internet connection); language issues; good information on the service, including price in advance and charging detail records

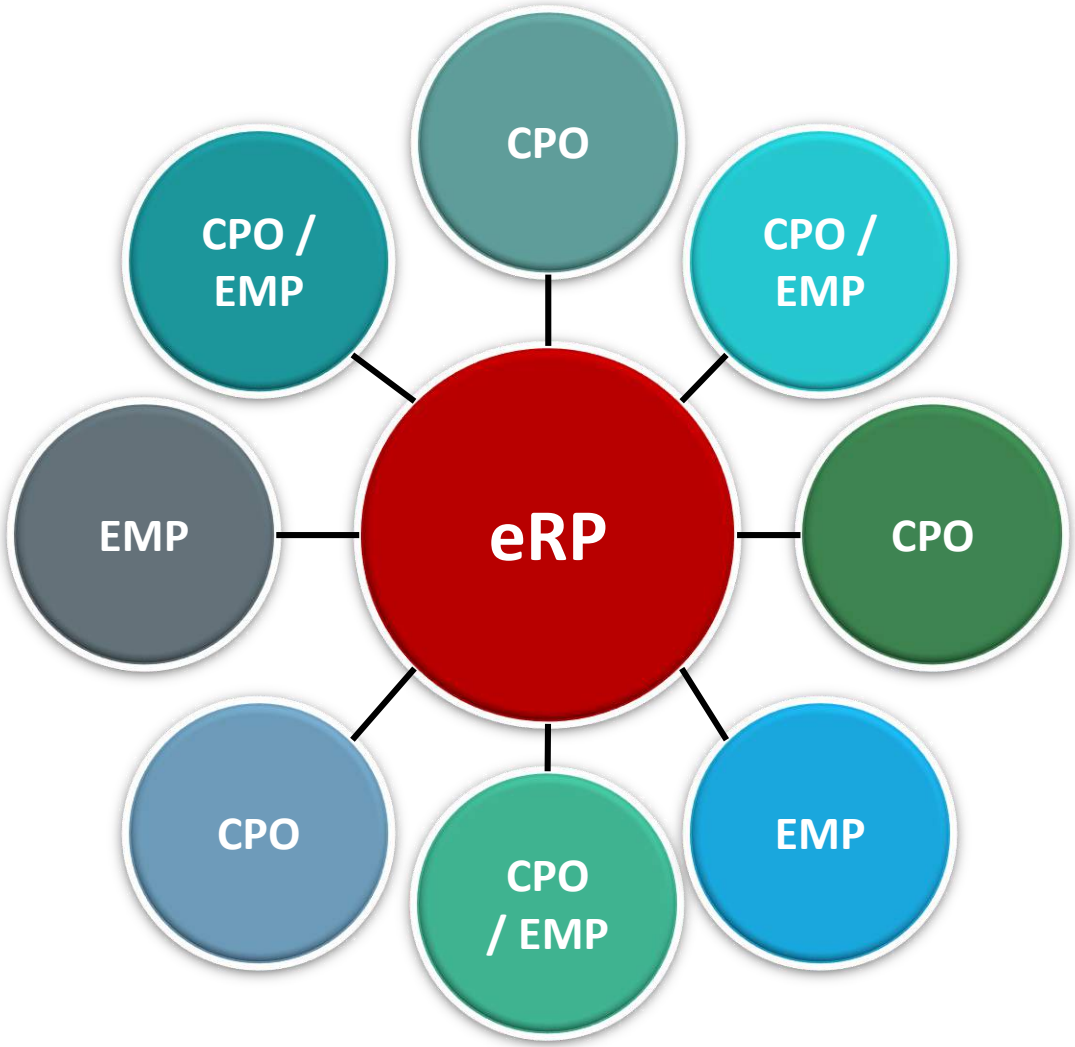
Part 2: Option #2 Roaming via an eRoaming Platform

Main features

- An intermediary that links up operators
- Manage and facilitate cross-operator roaming

➡IT connections to support exchange of data

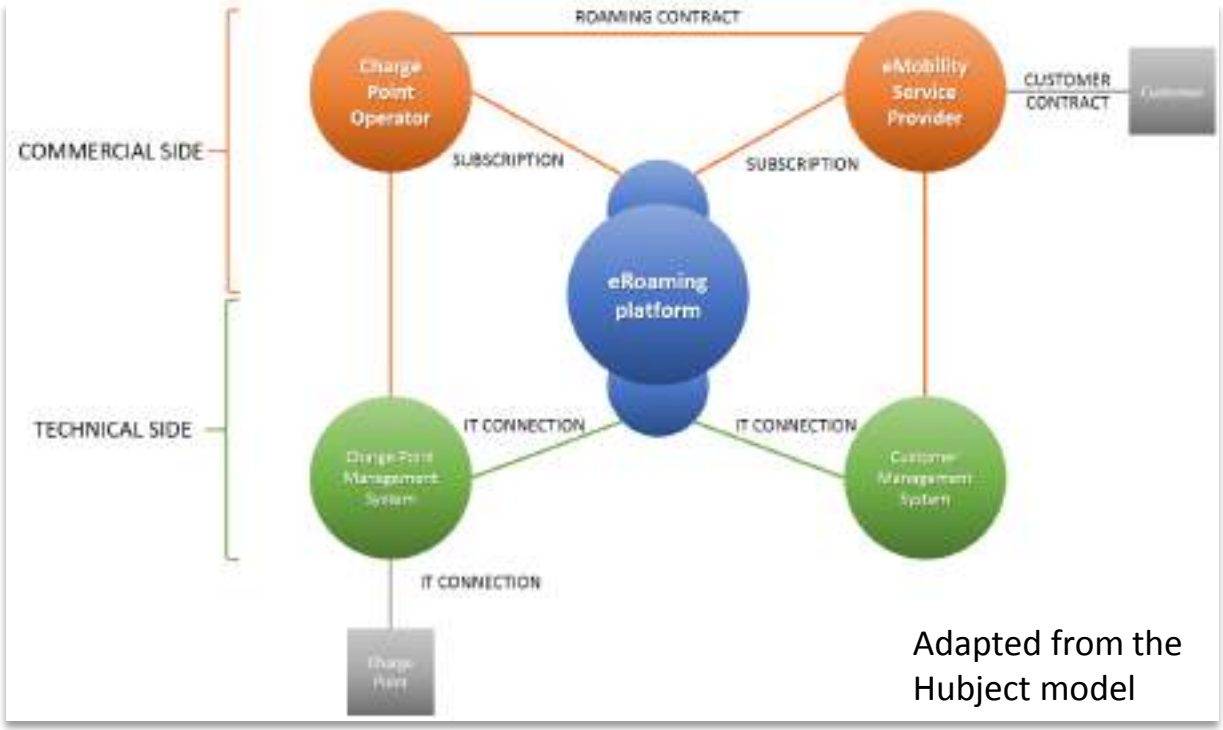
➡virtual forum for CPOs and EMPs



Part 2: Option #2 Roaming via an eRoaming Platform

Main features

- Subscription to the eRP
- Business contracts with the eRoaming partners

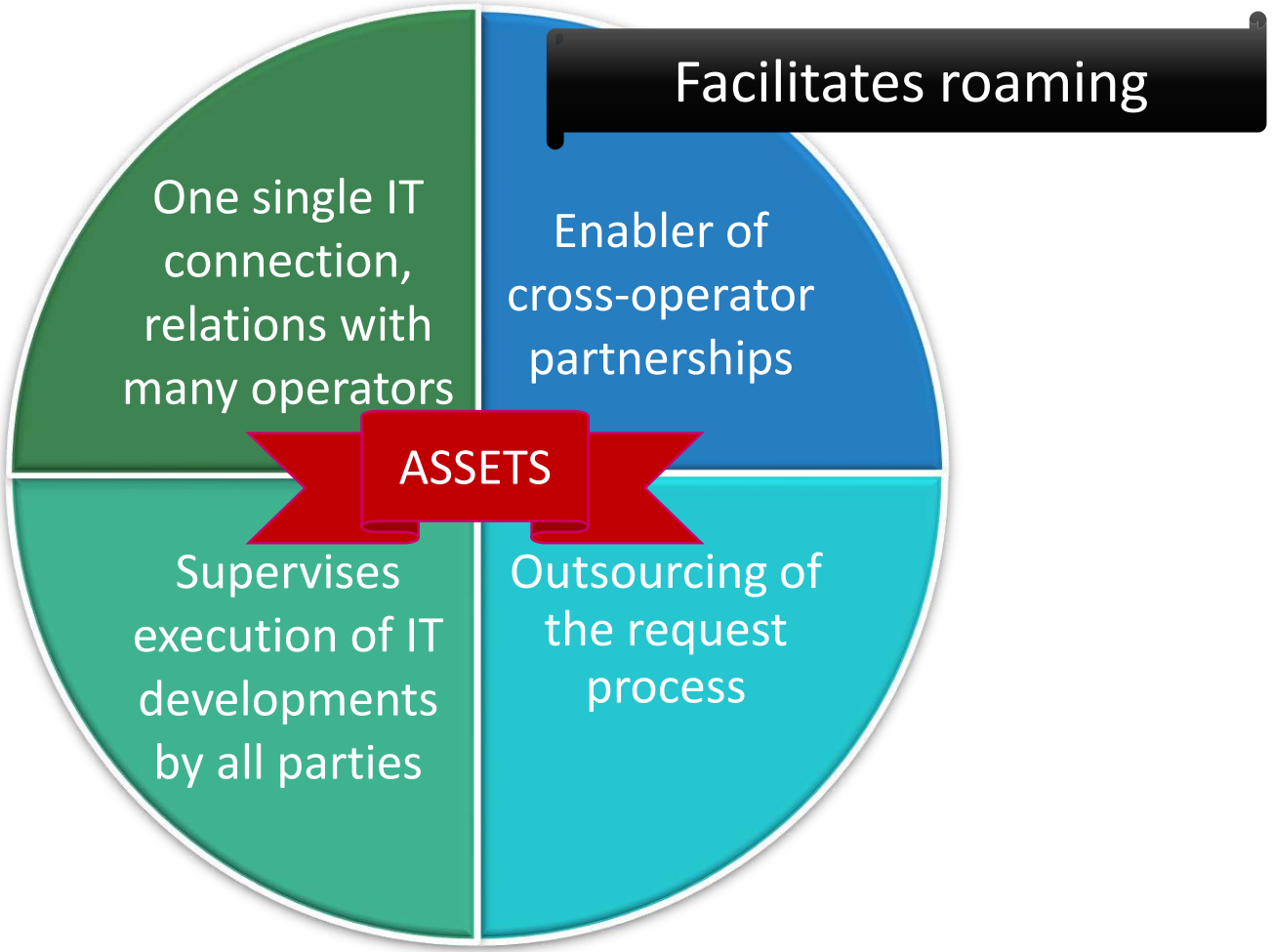


Adapted from the Hubject model

- Various eRoaming platforms
- Pan-European initiative to connect eRPs

Part 2: Option #2 Roaming via an eRoaming Platform

Assessment of the solution by the ecosystem

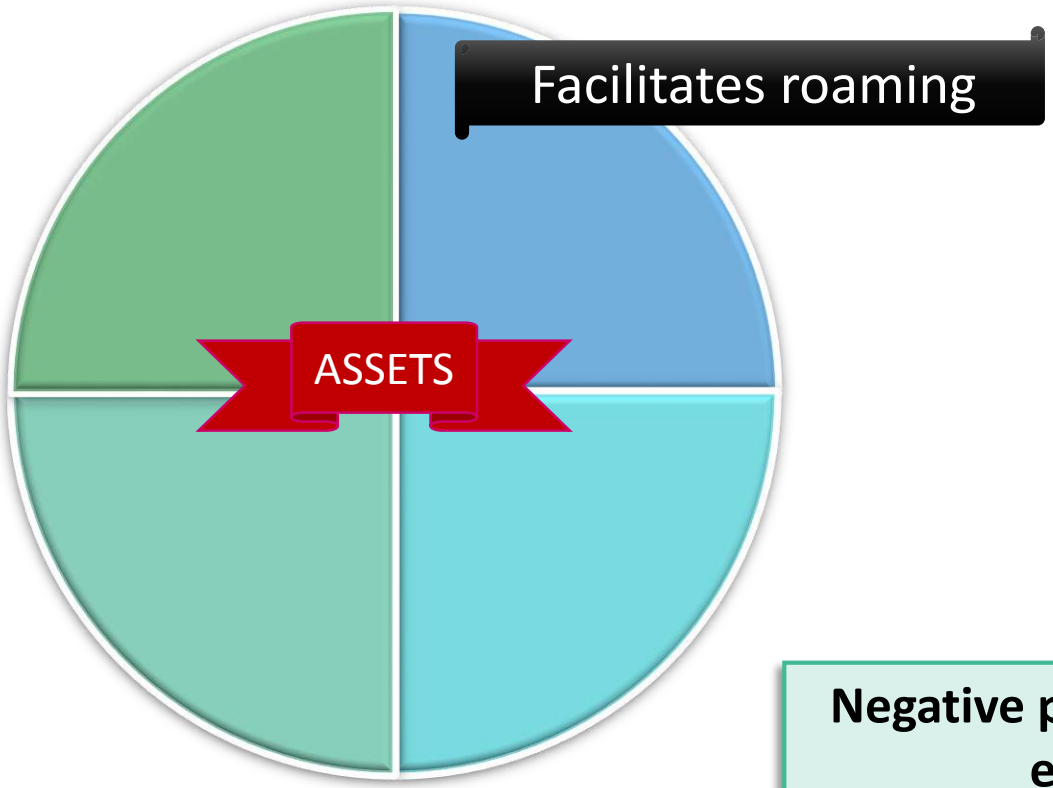


Part 2: Option #2 Roaming via an eRoaming Platform

LIMITS

Price-performance ratio of the service provided by the eRP questionned

- Cost of the subscription: might be a burden + impact on the B2C price
- No financial clearing (is changing), no hedge of default risk among operators



LIMITS

Existence of various platforms and uncompleteness of the pan-European initiative

- Various communication protocols
- Need (at least) to subscribe to various platforms

Assessment of the solution by the ecosystem

Negative perception of eRPs

- Misperceptions that the eRP sells the operator's data
- Unwillingness to be bonded to a 3rd party

LIMITS

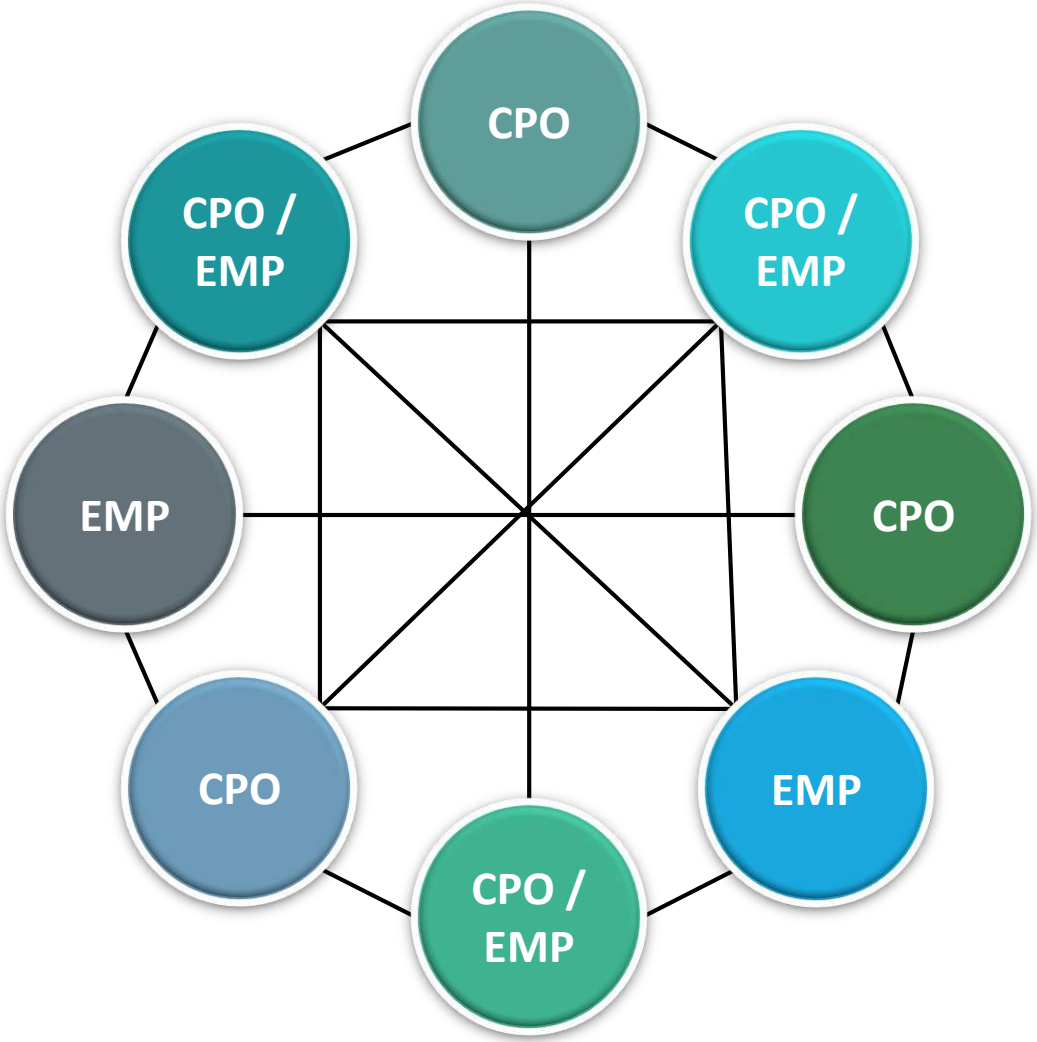
Part 2: Option #3 Roaming via P2P connections

Main features

- P2P roaming =

  Multiple IT connections and business contracts

- Historically: different communication protocols



Part 2: Option #3 Roaming via standardised P2P connections

Main features

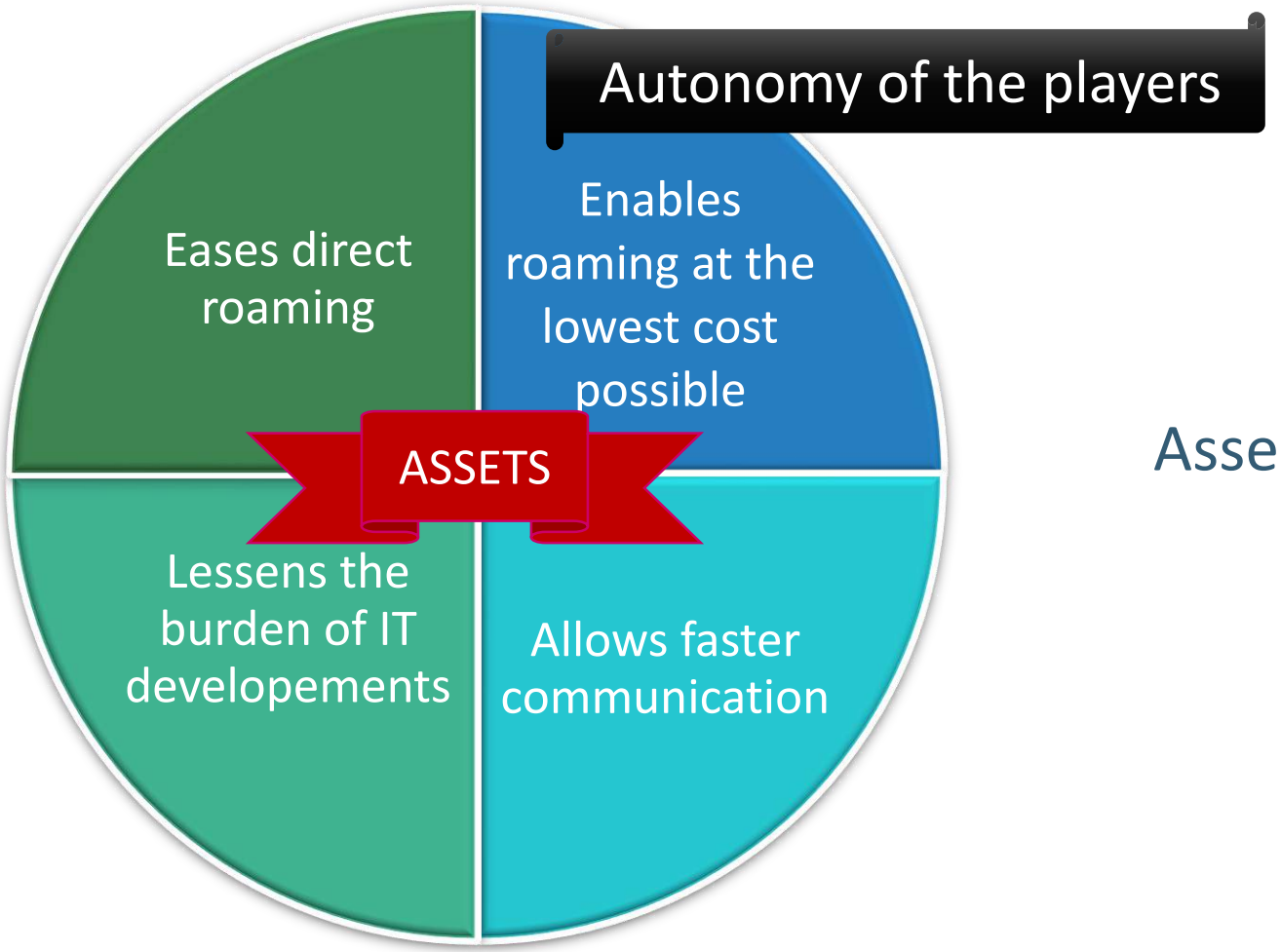
- The **Open Charge Point Interface (OCPI)**: NEWLY developped by Dutch eMobility players (last update: version 2.1.1, Jan. 2017).
- Independant roaming protocol, freely available to any operator, enabling automated roaming and supporting real-time exchange of data.

➡ A common language

- OCPI can be used on a peer-to-peer basis as well as via a hub.
- Implemented by a growing number of players, especially big ones

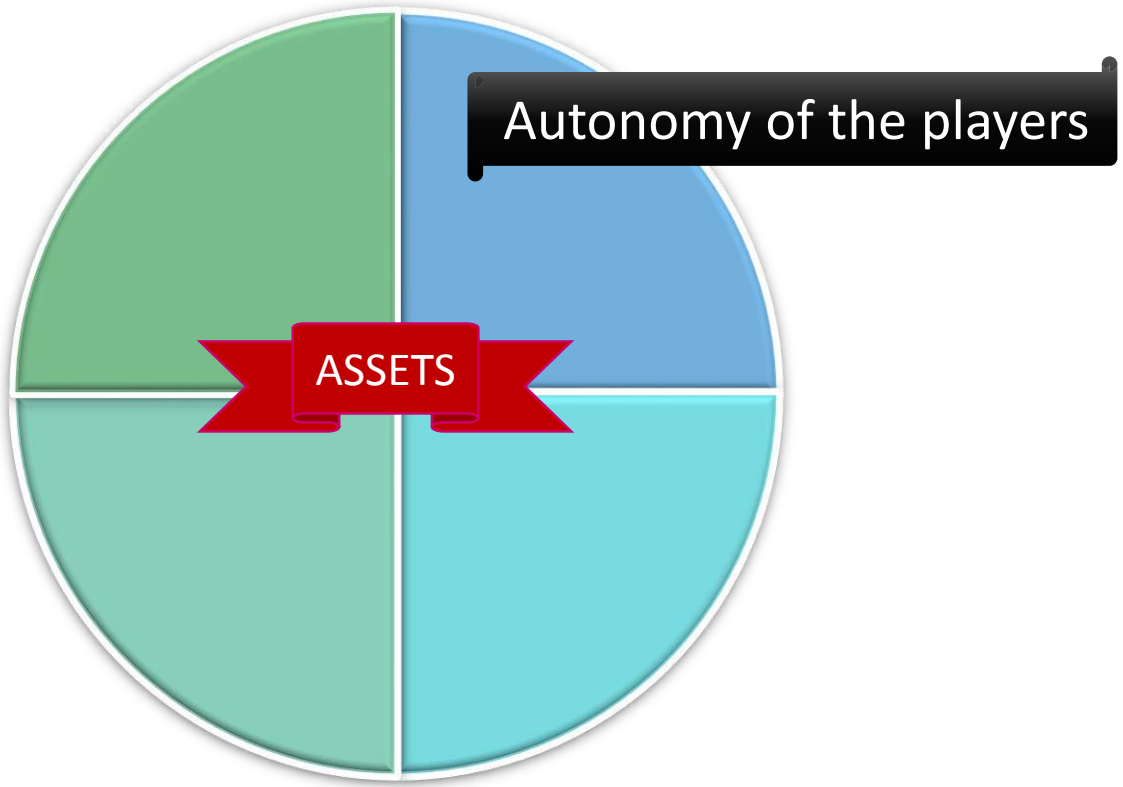
e.g. the members of the Open Fast Charge Alliance (Fastned, Sodetrel, Smatrics, GrØnn Kontakt, Gotthard FASTcharge)

Part 2: Option #3 Roaming via standardised P2P connections



Assessment of the solution by the ecosystem

Part 2: Option #3 Roaming via standardised P2P connections



Assessment of the solution by the ecosystem

Questioning about the capacity to evolve fast enough and support new services

- Today, does not support reservation
- Multi-party upgrading may be long
- Risk of supplementary developments by the operators on an individual basis

LIMITS

Conclusion: gaps in the picture

- End goal: provide an **EASY, SEAMLESS and AFFORDABLE** charging service to the end customer

  ➡ NEED TO PROGRESS

- Competing or complementary solutions?
- Lack of knowledge on ad hoc solutions and roaming via OCPI
  - Need to clarify the expectations about ad hoc, requested features and prefered options.
  - Need to provide feedbacks on implementation of OCPI
- Toward a high quality service
  - Need to define the ingredients of a customer-friendly, cross-border charging service
  - Need to take into account the customers' preferences

Conclusion: fill in the gaps

- Test cross-border interoperability under real-life conditions (eRoaming via eRP, ad hoc)
- Assess different options (+OCPI)

to help advance the knowledge and provide recommendations.