MOBI.E OCPI – PHASE 1

OCPI Implementation within the context of MOBI.E and PT

Version 0.6

SUBJECT: MOBI.E OCPI – PHASE 1

VERSION: 0.6

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TABLE OF CONTENTS

1 Introduction 4
1.1 Document Purpose and Motivations 4
1.2 Target Audience 4
1.3 Preliminary Remarks 4
1.4 Bibliography 4
1.5 List of Terms and Abbreviations 4
2 MOBI.E OCPI Roadmap 6
2.1 Why OCPI 6
2.2 Overall Plan and Objectives 6
2.3 Reference Architecture Diagrams 8
2.3.1 Phase 1 10
2.3.2 Phase 2 11
2.3.3 Phase 3 11
2.3.4 Phase 4 12
2.3.5 Phase 5 12
2.4 Features overview 13
2.5 General rules and legacy support 13
2.6 Support of new OCPI versions 13
2.7 Other protocols support 14
3 MOBI.E OCPI Phase 1 Definition 15
3.1 Overview 15
3.1.1 Relevant Assumptions 15
3.1.2 Overall Topology 15
3.1.3 Message Routing 15
3.1.4 Implemented Modules 16
3.1.5 Endpoint structure 16
3.1.6 Security considerations 16
3.1.7 Offline Behavior 16
3.2 Versions module 17

3.2.1 Technical considerations for Phase 1 17
3.3 Credentials module 17
3.3.1 Technical considerations for Phase 1 17
3.4 Locations module 18
3.4.1 Technical considerations for Phase 1 18
3.4.2 Methods to be implemented 18
3.4.3 Objects Definition 18
3.5 Sessions module 22
3.5.1 Technical considerations for Phase 1 22
3.5.2 Methods to be implemented 22
3.5.3 Objects description 22
3.6 CDRs Module 24
3.6.1 Technical considerations for Phase 1 24
3.6.2 Methods to be implemented 24
3.6.3 Objects description 24
3.7 Tariffs Module 27
3.7.1 Technical considerations for Phase 1 27
3.7.2 Methods to be implemented 27
3.7.3 Objects description 27
3.8 Tokens Module 29
3.8.1 Technical considerations for Phase 1 29
3.8.2 Methods to be implemented 29
3.8.3 Objects description 29
3.9 Commands Module 31
3.9.1 Technical considerations for Phase 1 31
3.9.2 Methods to be implemented 31
3.9.3 Commands and Objects Description 31
4 Miscellaneous 36
4.1 OCPI IDs and current compatibility 36
4.1.1 General remarks 36
4.1.2 Party ID (according to ISO/IEC-15118) 36
4.1.3 EVSE ID (according to eMI3) 37
4.1.4 Contract ID (according to eMI3) 37

1 Introduction

1.1 Document Purpose and Motivations

This document is intended to explicitly present MOBI.E's vision and action plan concerning the implementation of a standardized approach to the Portuguese e-mobility ecosystem to evolve under the guidelines of the OCPI protocol.

In particular, it should be carefully read and understood together with (1).

Due to its technical nature and to make sure that it is understood by all relevant stakeholders (national and foreign) this document has been written in English.

1.2 Target Audience

This document is specifically targeted at the CEME [EMSP]'s technical teams (and partners) in order to be able to perform the required developments to integrate their platforms with MOBI.E.

Chapters 2 and 3 are directed at all the different stakeholders of the MOBI.E's ecosystem.

1.3 Preliminary Remarks

Relevant tables in the document for the different objects show only the supported fields and operations. Whenever a field is not present then this means that it is not supported, eg. even though the request may be valid, the content for those fields that are not supported will be ignored.

Whenever a new field is being proposed, it is prepended by the prefix: "mobie_*".

1.4 Bibliography

1. **NKL.** *OCPI 2.2 Open Charge Point Interface.* 2019.

2. **eMobility ICT Interoperability Innovation Group (eMI3).** *Electric Vehicle ICT Interface Specifications - Part 2: Business Objects.* 2015. V1.0.

1.5 List of Terms and Abbreviations

Term	Language	Name	Definition (if applicable)
CDR	EN	Charge Detail Record	The object to be used for billing purposes.
CEME	PT	Comercializador de eletricidade para a Mobilidade Elétrica	
CPO	EN	Charging Point Operator	
EMSP	EN	E-Mobility Service Provider	
ERSE	PT	Entidade Reguladora dos Serviços Energéticos	
IPR	EN	Intellectual Property Rights	
MOBI.E	N/A	MOBI.E S.A.	
N/A	EN	Not applicable	

Term	Language	Name	Definition (if applicable)
NAP	EN	National Access Point	
NSP	EN	Navigation Service Provider	
OCHP	EN	Open Clearing House Protocol	
OCPI	EN	Open Charge Point Interface	
OCPP	EN	Open Charge Point Protocol	
OICP	EN	Open InterCharge Protocol	
OPC	PT	Operador de Pontos de Carregamento	
TBD	EN	To be decided	

2 MOBI.E OCPI Roadmap

2.1 Why OCPI

Since the beginning of the MOBI.E program, Portugal has sought a pioneering role regarding the implementation of advanced e-mobility management models procedures and best practices seeking to ensure the added value and benefits of a universal and open model.

The step taken in October 2018, with the introduction of the commercial phase, led to the development of a whole set of new integrated processes and data models that finally materialized the benefits of the MOBI.E framework, leading to an integrated ecosystem of almost 50 economic agents (counting CPOs and EMSPs). This model has privileged the following:

- "Certification"-like process for charging stations integration into the Portuguese network;
- Accountability in the integration with the energy sector (DSOs and Electricity retailers);
- Complete data model + full billing pre-processing handled by MOBI.E (above the current regulated obligations);
- Removal of virtually any technological barrier for an entity to operate either as a CPO [OPC] or EMSP [CEME].

In spite of its many advantages, it has become clear to MOBI.E that it should attempt to harmonize its data model and processes towards international best practices and standards first and foremost to define a manageable evolving path for the entire ecosystem, and also not to align on "lower" standards imposed by legacy systems and common practices from the local industry incumbents.

As a result and focusing solely on the interfaces between the electric mobility entities (and not with the electric sector), MOBI.E has decided to take a path of convergence with the OCPI *de facto* standard, which should be adapted as the basis for the future evolution of the reference integration API to be implemented by MOBI.E and proposed to the entire ecosystem.

It is (arguably) the only protocol that fulfills all the following requirements:

- It is standard (or it has a vision to become "a standard")
- It converges with the IT industry best-practices concerning data exchange and security
- It is completely IPR-free
- It has an active collaborating community
- Its use is widespread in the world
- It is agnostic to business models
- and, most importantly, under its latest version, it can be adapted and/or extended to the specifics of the MOBI.E ecosystem.

2.2 Overall Plan and Objectives

From a long-term perspective, the following examples include some possible applications enabled by the implementation of OCPI in its entirety:

1. Enabling other e-mobility stakeholders to get real-time access to charging station information;
2. Notifying EMSP and CPOs that charges have been started or stopped, and update session data accordingly in real-time;
3. Allowing the creation of users by EMSP into MOBI.E via OCPI;
4. Enabling charges to be started via PT EMSP backends (more particularly via apps or ad-hoc charging modes);

5. Enabling PT CPOs to user their own backends for full independent management[1];
6. Enabling other countries' EMSP to roam and charge in PT (If allowed without the need for a national registered CEME);
7. Enabling PT EMSP's users to roam and charge in other countries via the PT's CEME app;
8. Sending CDRs to all relevant stakeholders for billing purposes, within the scope of MOBI.E, fully shifting current implementation to OCPI;
9. and many other use cases.

While some of the use cases mentioned above may already be possible with the current MOBI.E implementation, either they rely on MOBI.E's own specifications or are not generic enough in order to ensure the coverage of the industry expectations without finer evolutions to the existing models. The following table presents a preliminary plan to achieve the different phases of implementation, as presented.

Table 1 MOBI.E OCPI integration planned phases

Phase	Milestone description	Target Date in Production
Phase 1	EMSP Integration	30/09/2020
Phase 2	Partial CPO Integration	31/12/2020
Phase 3	Full-CPO Integration	TBD
Phase 4	Foreign E-Mobility Roaming in Portugal	TBD
Phase 5	E-Mobility Roaming abroad	TBD

Concerning the table above, some fundamental constraints exist that prevent the commitment to a concrete release calendar, namely:

- Vision alignment with key internal stakeholders
- Choice to upgrade to OCPI 3.X when it becomes available (instead of proceeding with the different phases under OCPI 2.2)
- Required changes in e-mobility regulation (namely for Phase 3)
- Political alignment and long-term vision
- Catalogue of value-added services to be provided by MOBI.E

Other phases may be introduced or changed beyond Phase 2, which are not necessarily the ones presented above.

A long-term vision for e-mobility in Portugal, would consider the widespread implementation of the following architecture:

[1] The implementation of this use case is dependent upon required changes on the "Regulamento de Mobilidade Elétrica"

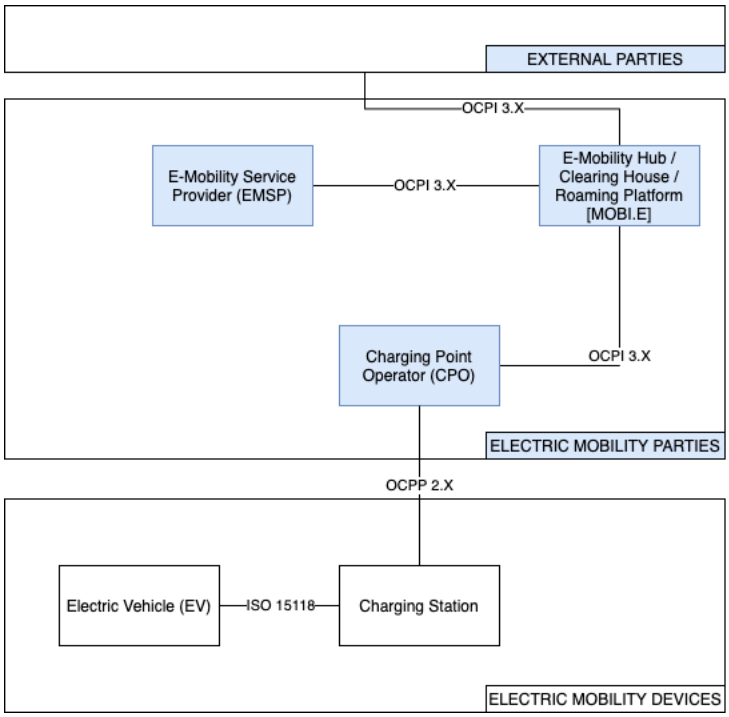

Figure 1 Medium to long-term vision of e-mobility protocols in the PT ecosystem

In particular, the implementation of this reference architecture falls under the following assumptions:

1. End-to-end security on all charging transactions
2. Full auditability of messages across the different interfaces
3. Mandatory certification for all interfaces (platforms)

Any deeper explanation is out of scope for this document.

2.3 Reference Architecture Diagrams

The different diagrams shown in this section reflect a high-level vision on the evolution of the MOBI.E ecosystem throughout the full OCPI implementation.

Generally speaking, the architectures hereby presented refer to the new topologies allowed. In practical terms (except for any decisions on deprecating previously implemented features), previous phase positionings could/should be supported.

As a departure point, let's consider a perspective on the current architecture implemented:

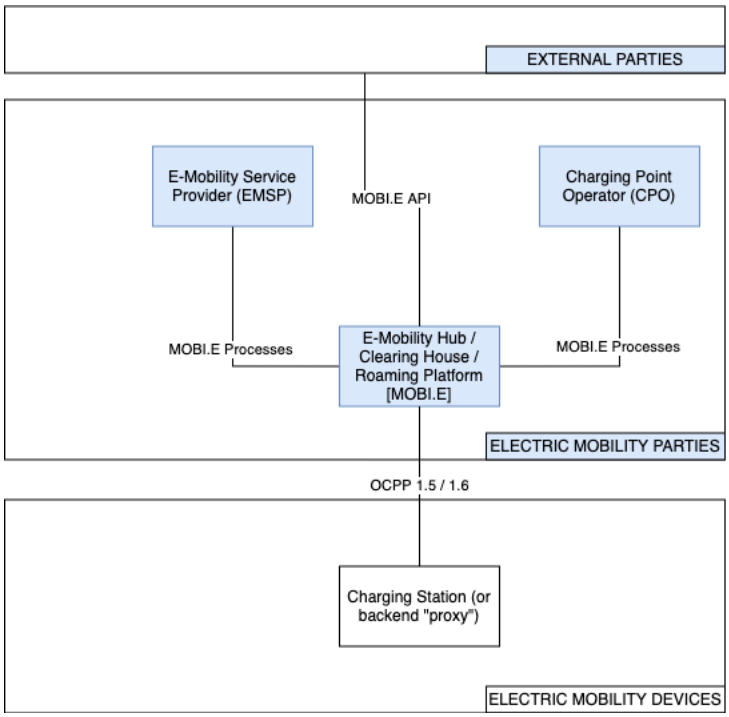

Figure 2 Reference architecture for Phase 0 (Current)

In the current architecture, we could identify the existing interfaces as a set of:

- Processes and information exchange via manual interfaces (eg. e-mail)
- File-sharing via SFTP
- APIs for
    - Users/cards and contracts CRUD processes
    - Webhooks for events subscription (usage.started, usage.updated, usage.stopped, usage.validated, …)
    - Remote actions (e.g start/stop) but without proper validation across the entire network

2.3.1 Phase 1

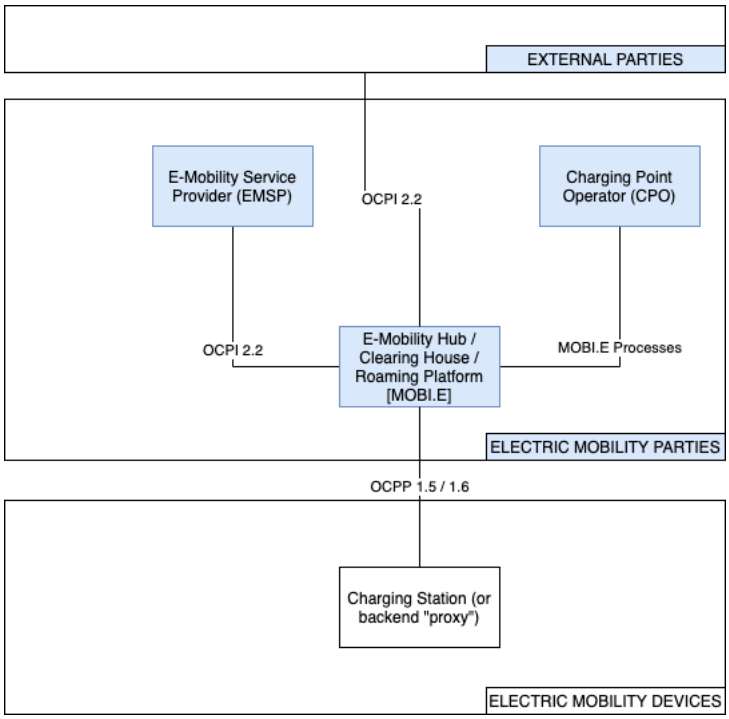

Figure 3 Reference architecture for Phase 1

The following changes are highlighted for Phase 1:

- The ability of CPOs to integrate their own backends to MOBI.E via OCPP (specific requirements not covered in this document)
- EMSP integration with MOBI.E via OCPI
- OCPI as the main external interface for 3rd parties' data-sharing

2.3.2 Phase 2

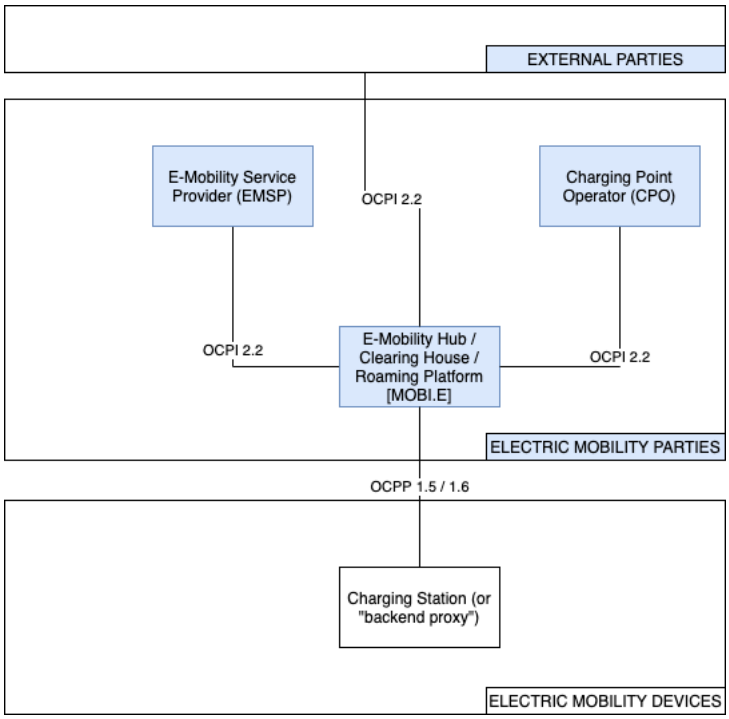

Figure 4 Reference Architecture for Phase 2

With the implementation of Phase 2, CPOs would have the possibility to use the OCPI interface to:

- Create and update tariffs
- Get real-time data via the Sessions module
- Integrate billing data with CDRs

2.3.3 Phase 3

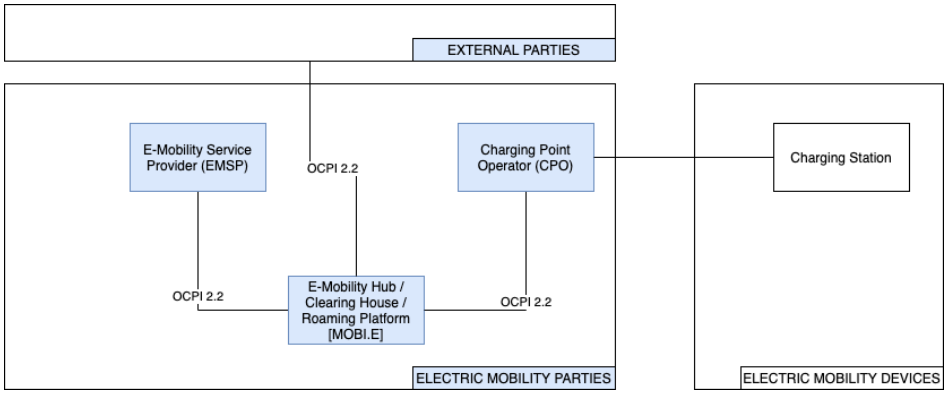

Figure 5 Reference Architecture for Phase 3

With the conclusion of Phase 3, CPOs gain the ability to be in full control of the charging process and may now use the OCPI interface to:

- Create and update charging station data
- Notify MOBI.E (and the EMSP) of any change with charging station availability
- Be the source of data for sessions and CDRs

2.3.4 Phase 4

The following diagram showcases all possible options for interactions concerning roaming transactions occurring in Portugal:

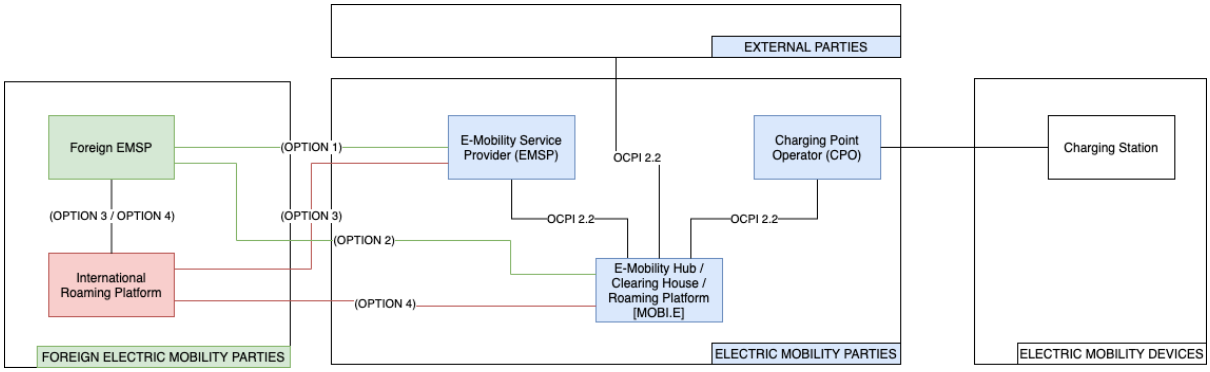

Figure 6 Reference Architecture for Phase 4

The discussion concerning the different options presented is outside of the scope of this document.

2.3.5 Phase 5

The following diagram showcases all possible options for interactions concerning roaming transactions occurring abroad by Portuguese customers:

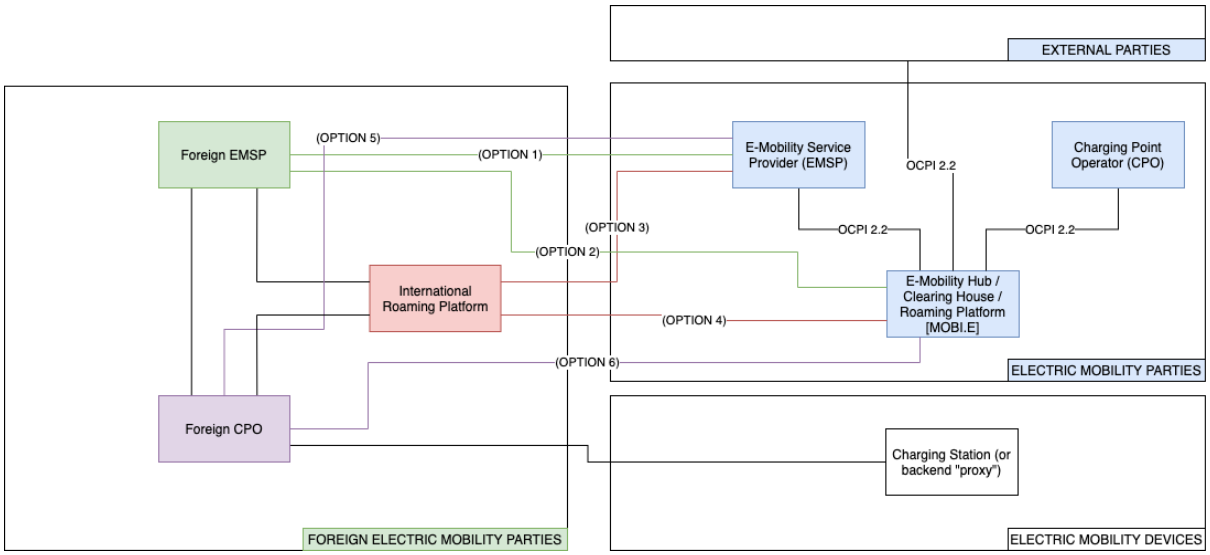

Figure 7 Reference Architecture for Phase 5

With Phase 5, the full MOBI.E model comes into play. It should be noted that, unless similar energy settlement emerges at the European level like we have in Portugal, EMSPs should be completely free to establish bilateral agreements with CPOs and/or EMSP internationally. However, it is envisioned that MOBI.E could/should be able to facilitate this process by providing this technological integration by default to the e-mobility ecosystem.

The discussion concerning the different options presented is outside of the scope of this document.

2.4 Features overview

Table 2 MOBI.E OCPI High-Level Features Rollout

Feature	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Charging Stations lifecycle management	CPOs will continue to communicate with MOBI.E via the existing processes.	CPOs will be able to communicate with MOBI.E via OCPI.			
Charging Stations Management and Connectivity	Charging Stations must be directly connected to the MOBI.E platform via OCPP.		Charging Stations may be connected to MOBI.E via the CPO backend (via OCPI).		
Users and Tokens Synchronization	Supported via the OCPI interface (existing API will no longer be supported).				
Charge Authorization	MOBI.E authorizes all charges based on the information synced by the EMSP.		End-user authorization must be performed on MOBI.E's backend.	End-user authorization may be done in real-time on EMSP platform (always via MOBI.E's hub)	
Remote Start / Stop (including ad-hoc charging)	Supported and only available via the OCPI interface.				
Charging Station Reservation	Not supported within the MOBI.E public network, by definition.		To be evaluated as a value-added service for private locations.		
Smart Charging	Not supported as per current regulation.				

2.5 General rules and legacy support

It is not mandatory for an EMSP operating in Portugal to be integrated with MOBI.E via OCPI. In particular, an EMSP may continue to operate using the existing (legacy interfaces). Its only practical limitation lies in the fact that no remote operations would be allowed (namely remotely starting/stopping a charge).

There shall be no apps directly connected to MOBI.E's backend.

Once implemented, all relevant information shall be available on MOBI.E's OCPI endpoints, e.g. real-time session update shall be performed even for transactions that did not originate on the OCPI interface (eg. charging with an RFID card).

All existing APIs for tokens creation will cease to be supported upon the release of Phase 1.

Integration via files shall continue to be supported indefinitely (at least until December 2022).

2.6 Support of new OCPI versions

MOBI.E shall keep a policy to be an active participant / follower of OCPI and translate its requirements onto the MOBI.E ecosystem.

MOBI.E commits to providing guidelines and an action plan concerning relevant changes whenever a new version has been presented, with a maximum delay of 3 months following publication of the standard.

It is expected that V3.0 should come out before the end of 2020.

2.7 Other protocols support

While it is clear that other protocols exist that implement similar use cases, such as OICP or OCHP, MOBI.E does not explicitly support these protocols.

3 MOBI.E OCPI Phase 1 Definition

3.1 Overview

3.1.1 Relevant Assumptions

- All charging stations are connected to the MOBI.E backend. If the CPO chooses to use its own backend system, then it must comply with OCPP and from MOBI.E's perspective it shall be completely transparent and allow relevant operations.
- EMSPs must keep all user tokens synchronized with MOBI.E at all times, so that all transactions can be correctly integrated into MOBI.E's backend.
- Whenever physical cards are used, it is still expected that users shall be registered onto the MOBI.E platform
- (…)

3.1.2 Overall Topology

From a charging topology perspective,

- Connector: Socket/Plug – OK
- EVSE: EVSE – OK
- Location: To be taken as a Charging Station

MOBI.E platform shall be used in a variant of the Hub Model [3.7], which may also have a role equivalent to that of a CPO, by default. Roles to be considered:

Table 3

Role	Equivalent Role in MOBI.E
CPO	OPC [MOBI.E for Phase 1]
EMSP	CEME
HUB	MOBI.E
NAP	N/A
NSP	All parties requesting locations data

3.1.3 Message Routing

Message Routing does not have to be considered for the first implementation (since the CPO role is not to be supported at first), however it is advisable that headers are correctly implemented. In this case, consider the following:

Table 4

Route	TO Headers	FROM Headers
Requesting platform to Hub	Hub [MOBIE]	Requesting Platform [CEME]
Hub to Requesting platform	Requesting Platform [CEME]	Hub [MOBIE]

X-Request-ID and X-Correlation-ID shall be UUID. They must not be the same, even if at this point, they can be used interchangeably.

3.1.4 Implemented Modules

Within the context of Phase 1, the following module relationship exists:

Table 5 Mandatory roles to be implemented by MOBI.E and the EMSP [CEME] within OCPI

Module	MOBI.E	EMSP
CDRs	X	Optional
Commands	X	Optional
Credentials	X	X
Hub Client Info	X	Optional
Locations	X	Optional
Sessions	X	Optional
Tariffs	X	Optional
Tokens	X	Optional
Versions	X	X

Only the above modules are implemented on MOBI.E's side.

Even though some modules can be considered to be optional, it is strongly encouraged to implement them.

3.1.5 Endpoint structure

Endpoint for MOBI.E shall be https://mobie.pt/ocpi/2.2/

All EMSP endpoints should be of the form: https://[ceme_server]/ocpi/emsp/2.2/

For all other external providers, they are free to use any structure.

3.1.6 Security considerations

Even though the current OCPI certification only requires server-side SSL certificates for communication between platforms, MOBI.E shall impose additional requirements to prevent access to data, namely:

- Client-side certificate issued by MOBI.E to be used by EMSP system
- TLS minimum version is 1.2

The MOBI.E platform shall perform a functional validation of the security requirements on the interface, e.g. it must not be possible for a platform using EMSP1 credentials to communicate with MOBI.E via an IP (or certificate) registered with EMSP2.

Any credentials-related policies shall be declared within the corresponding OCPI module.

For a given EMSP (or CPO in the future) all modules to be implemented by the role must belong to the same platform.

The same system may represent one or more entities (and roles). Credentials shall be specific to each role.

3.1.7 Offline Behavior

In terms of offline behavior, the MOBI.E platform will not perform any retry when pushing data.

3.2 Versions module

3.2.1 Technical considerations for Phase 1

MOBI.E endpoint: https://ocpi.mobie.pt/versions

Details endpoint: https://ocpi.mobie.pt/2.2/details

The only version supported by MOBI.E (as of this document) shall be v2.2. It is not possible to perform an integration without explicit OCPI 2.2 endpoints.

3.3 Credentials module

3.3.1 Technical considerations for Phase 1

MOBI.E is always the Sender of the Credentials module.

Whenever an EMSP wants to register its platform onto MOBI.E, the EMSP shall supply MOBI.E with CREDENTIALS_TOKEN_A.

The OCPI registration process within MOBI.E shall fail if:

- The CEME has not implemented a compatible (2.2) version for OCPI.
- The CEME has not implemented the required modules (please refer to Table 5 above).

The following operations shall be supported by all systems:

- Changing endpoints for the current version
- Updating the credentials and resetting the credentials token

Any of the parties shall be able to initiate any of the above processes.

MOBI.E shall implement an internal process to renew credentials with all systems on a periodical basis. By default, this shall be enforced 7 days after the last credentials change.

All operator logos and data shall be provided via the business details field. It is the “role” responsibility to keep this information updated.

3.4 Locations module

3.4.1 Technical considerations for Phase 1

This shall be the first functional module to be delivered.

As mentioned, "when a CPO creates Location objects, it pushes them to connected EMSP by calling PUT on the Receivers Locations endpoint." For Phase 1, MOBI.E fully controls this process and charging and MOBI.E shall implement a process for EMSP to be able to subscribe to the following events:

- Charging Station creation [PUT method]
- EVSE status update [PATCH method]

The number of GET request be will be limited per requesting party (eg. One FULL request per 5 minutes), and it will be cached (1 minute).

Private charging locations will not be published via OCPI. As mentioned, "(…) reimbursement via eMSP is still possible by sending CDRs to eMSP."

For OCPI purposes a Location shall be the equivalent of a charging station. Pools may be used in the future, but not at this moment.

For locations update timestamps please consider the latest update from any of the underlying EVSEs.

MOBI.E shall support "date_from" and "date_to" options on GET requests have to be supported.

3.4.2 Methods to be implemented

3.4.2.1 EMSP

Method	Direction	Description of usage
GET	Request	Responding with the status of a charging station
PUT	Response	Pushing the creation of a new charging station
PATCH	Response	Updating the status of an EVSE (including EOL or REMOVED)

3.4.2.2 MOBI.E

Method	Direction	Description of usage
GET	Response	Receiving requests from external parties
PUT	Request	Pushing the creation of a new charging station
PATCH	Request	Updating the status of an EVSE (including EOL or REMOVED)

3.4.3 Objects Definition

3.4.3.1 Location

Only the following properties shall be communicated:

Table 6

Property	Values	Mandatory	Comments
country_code	PT	TRUE	Alpha-2

Property	Values	Mandatory	Comments
party_id		TRUE	ISO-15118 Codes to be defined by MOBI.E. [OPC]
id		TRUE	To be validated and issued by MOBI.E. LSB-00175 (example)
publish	true	TRUE	
name		FALSE	MOBI.E shall do its best to present a representative name for the location. Names will be shown in Portuguese.
address		FALSE	Street and house number
city		TRUE	City/municipality. Names shall be provided in Portuguese
country	PRT	TRUE	Alpha-3. Roaming is not supported within the interface as of Phase 1.
postal_code		FALSE	
coordinates		TRUE	
parking_type	ALONG_MOTORWAY PARKING_GARAGE PARKING_LOT ON_DRIVEWAY ON_STREET UNDERGROUND_GARAGE	FALSE	
evses		TRUE	
operator	Only if OPC exists. Otherwise use generic name.	TRUE	
time_zone	Europe/Lisbon Atlantic/Azores	TRUE	
mobie_voltage_level	BTN / BTE / MT	TRUE	
last_updated		TRUE	

3.4.3.2 EVSE

Table 7

Property	Values	Mandatory	Comments
uid		TRUE	Example: LSB-00175-01

Property	Values	Mandatory	Comments
evse_id		TRUE	Same as above
Status	PLANNED [ToInstall] AVAILABLE [Idle] CHARGING [InUse] INOPERATIVE [InMaintenance] OUTOFORDER [OutOfService] RESERVED [Reserved] UNKNOWN [Unknown] REMOVED [EndOfLife]	TRUE	
Capabilities	REMOTE_START_STOP_CAPABLE RFID_READER	TRUE	
Connectors		TRUE	
last_updated		TRUE	

3.4.3.3 Connector

Table 8

Property	Values	Mandatory	Comments
id		TRUE	LSB-000175-01-01
standard	CHADEMO IEC_62196_T2 IEC_62196_T2_COMBO	TRUE	
format	SOCKET CABLE	TRUE	
power_type	AC_1_PHASE AC_3_PHASE DC	TRUE	
max_voltage	400 (example)	TRUE	In V
max_amperage	16 (example)	TRUE	In A
max_electric_power	22000	FALSE	In W
tariff_ids		TRUE	To be defined in the Tariffs Module
terms_and_conditions		TRUE	In particular, the terms and conditions shall include the precision level for DC measurement, if applicable.

Property	Values	Mandatory	Comments
last_updated		TRUE	

3.5 Sessions module

3.5.1 Technical considerations for Phase 1

Phase 1 implementation shall take into consideration the following:

- No charging preferences to be considered.
- No reservations to be considered.
- Sessions are to be considered similar to the usageStarted, [usageUpdated], usageStopped events.

3.5.2 Methods to be implemented

3.5.2.1 EMSP

Method	Direction	Description of usage
GET	Request	Getting sessions of charging sessions last updated
PUT	Response	Send a new/updated session object to the EMSP
PATCH	Response	Update the session object

3.5.2.2 MOBI.E

Method	Direction	Description of usage
GET	Response	Getting sessions of charging sessions last updated
PUT	Request	Send a new/updated session object to the EMSP
PATCH	Request	Update the session object

3.5.3 Objects description

3.5.3.1 Sessions

Table 9

Property	Mandatory	Value	Comments
country_code	TRUE	PT	
party_id	TRUE		
id	TRUE		Always provided by MOBI.E
start_date_time	TRUE		
end_date_time	TRUE		
kwh	TRUE		
cdr_token	TRUE		
auth_method	TRUE	WHITELIST	
location_id	TRUE		
evse_uid	TRUE		

Property	Mandatory	Value	Comments
connector_id	TRUE		
currency	TRUE	EUR	
charging_periods	FALSE		
status	TRUE	ACTIVE COMPLETED INVALID PENDING	Status INVALID to be considered for charging sessions with errors (not to be billed). PENDING could potentially be used for remote start request that have already acknowledged the initial response but not yet the result.
last_updated	TRUE		

3.6 CDRs Module

3.6.1 Technical considerations for Phase 1

The CDR is to be considered as in a concluded event. This is similar to the usageValidated event currently being considered.

For the first implementation, this will work concurrently to the existing interface specification.

3.6.2 Methods to be implemented

3.6.2.1 MOBI.E – Sender

Method	Direction	Description of usage
GET	Response	Respond with CDRs
POST	Request	Send a new CDR

3.6.2.2 EMSP - Sender

The following methods are to be implemented:

Method	Direction	Description of usage
GET	Request	Retrieve CDRs for a given period
POST	Response	Receive a new CDR

3.6.3 Objects description

3.6.3.1 CDR

Table 10

Property	Mandatory	Value	Comments
country_code	TRUE	PT	
party_id	TRUE		
id	TRUE		Always provided by MOBI.E
start_date_time	TRUE		
end_date_time	TRUE		
session_id	TRUE		
cdr_token	TRUE		
auth_method	TRUE	WHITELIST	The EMSPs must implement the
cdr_location	TRUE		See remarks below concerning private charging stations.
currency	TRUE	EUR	
tariffs	TRUE		
charging_periods	FALSE		

Property	Mandatory	Value	Comments
Status	TRUE	COMPLETED	
total_cost	TRUE		
total_fixed_cost	TRUE		
total_energy	TRUE		
total_energy_cost	TRUE		
total_time	TRUE		
total_time_cost	TRUE		
total_parking_time	TRUE		
total_parking_cost	TRUE		
remark	FALSE		
credit	FALSE		
credit_reference_id	FALSE		
mobie_cdr_extension	TRUE		This is a new type customized to include all the remaining billing aspects not considered within the framework of OCPI.
Last_updated	TRUE		

The following CdrDimensionType may be received:

- ENERGY
- ENERGY_EXPORT
- ENERGY_IMPORT
- MAX_POWER
- MIN_POWER
- PARKING_TIME
- POWER
- TIME

For the CdrLocation class, since there are specific considerations to take concerning the access type for the charging stations, the following rule shall apply:

Table 11

Property	Mandatory per Access Type		Comments
	Private	Public	
id	TRUE	TRUE	
name	N/A	FALSE	
address	N/A	TRUE	
city	N/A	TRUE	
postal_code	N/A	FALSE	
country	N/A	TRUE	

Property	Mandatory per Access Type		Comments
	Private	Public	
coordinates	N/A	TRUE	
evse_uid	TRUE	TRUE	
evse_id	TRUE	TRUE	
connector_id	TRUE	TRUE	
connector_standard	N/A	TRUE	
connector_format	N/A	TRUE	
connector_power_type	N/A	TRUE	
mobie_voltage_level	TRUE	TRUE	

3.7 Tariffs Module

3.7.1 Technical considerations for Phase 1

Tariffs can be changed by CPOs, which is currently outside of the scope for OCPI for Phase 1.

This section is INFORMATIVE. Even though this information could/should be used by an EMSP for billing purposes, MOBI.E shall provide the billable CDR to be used by the EMSP. An EMSP MAY NOT use the tariffs information as an alternative source of data for billing. As such, for integration testing

It is recommended that EMSPs retrieve daily the value of the tariffs and should perform a (near) real-time request whenever one of its users is about to charge.

Note that within OCPI tariffs may be defined at the connector (EVSE) level.

Unlike what is mentioned in the Ad-Hoc example provided in the OCPI document, an EMSP is ALWAYS involved in the process, and the CDR is sent to an EMSP. However, a CPO may choose to use this interface to advertise their default tariffs only and only if they either provide an assisted operation (eg. in a service station) or the charging stations have an embedded payment card processor. In this case, the CPO must clearly advertise their "default" EMSP.

3.7.2 Methods to be implemented

3.7.2.1 MOBI.E – Sender

Method	Direction	Description of usage
GET	Response	Getting current and/or historical tariffs (please check!)

3.7.2.2 EMSP - Sender

The following methods are to be implemented:

Method	Direction	Description of usage
GET	Request	Getting current and/or historical tariffs (please check!)

3.7.3 Objects description

3.7.3.1 Tariffs

The following table describes the Tariffs object.

Table 12

Property	Mandatory	Value	Comments
country_code	TRUE	PT	
party_id	TRUE		
id	TRUE		Tariff ID
currency	TRUE	EUR	
type	TRUE	REGULAR AD_HOC_PAYMENT	Not sure whether ad_hoc_payment makes sense
tariff_alt_text	FALSE		This field may be used by the CPO to communicate any relevant discounts.

Property	Mandatory	Value	Comments
min_price	TRUE		
elements	TRUE		
start_date_time	FALSE		
stop_date_time	FALSE		
last_updated	TRUE		

The following TariffDimensionType values are allowed:

- ENERGY,
- FLAT,
- PARKING_TIME,
- TIME.

The following TariffRestrictions properties can be used:

- start_time
- end_time
- start_date
- end_date
- min_kwh
- max_kwh
- min_duration
- max_duration
- day_of_week

3.8 Tokens Module

3.8.1 Technical considerations for Phase 1

In the first phase the tokens module is key in order to allow EMSP to share tokens with MOBI.E (which is mandatory at this stage).

The EMSP must make sure that the tokens have been correctly synced with MOBI.E.

There will be no real-time authorization with external systems. For the sake of OCPI all tokens shall be whitelisted and managed within the MOBI.E platform.

MOBI.E MAY perform a GET request on the full list of tokens for a given EMSP. However, it is not the obligation of MOBI.E to do that and the EMSP should make sure that their list of tokens is up-to-date on MOBI.E's side.

3.8.2 Methods to be implemented

3.8.2.1 MOBI.E – Receiver

Method	Direction	Description of usage
GET	Response	The EMSP shall be able to retrieve its tokens as they are defined on MOBI.E.
PUT	Response	The EMSP shall be able to create a new or update an existing token
PATCH	Response	Partially update the token

3.8.2.2 EMSP – Sender

Method	Direction	Description of usage
GET	Request	The EMSP shall be able to retrieve its tokens
PUT	Request	The EMSP shall be able to create a new or update an existing token
PATCH	Request	Partially update the token

3.8.3 Objects description

Description of the Token object:

Property	Mandatory	Value	Comments
country_code	TRUE	PT	
party_id	TRUE		
uid	TRUE		internal_number if type=. Otherwise, if type is AD_HOC_USER or APP_USER, then it EMSP must use UUID.
type	TRUE	AD_HOC_USER APP_USER RFID	
contract_id	TRUE		Current PT[OPC] *. To be adapted according to eMA ID.

Property	Mandatory	Value	Comments
issuer	TRUE		Card/token issuer name. Can be freely defined by the EMSP.
valid	TRUE		
whitelist	TRUE	ALWAYS	
energy_contract	TRUE		In this case, this shall be the current contract defined per CEME with MOBI.E. supplier_name=cse code (to be defined by MOBI.E) contract_id=CT_*
last_updated	TRUE		

3.9 Commands Module

3.9.1 Technical considerations for Phase 1

The following commands shall be supported:

- START_SESSION
- STOP_SESSION
- UNLOCK_CONNECTOR

All processes are asynchronous. Therefore, it is MANDATORY for the EMSP to provide a unique identifier in the response_url.
For the unlock connector, it is important to note that the EMSP should not be authorized to use this functionality lightly. It is forbidden for EMSP to create apps that allow this command to be executed without validation.

3.9.2 Methods to be implemented

3.9.2.1 MOBI.E - Receiver

Table 13

Method	Direction	Description of usage
POST	Response	Acknowledgement of the initial command execution request.
POST	Request	Asynchronously respond to the EMSP request concerning its execution.

3.9.2.2 EMSP - Sender

Table 14

Method	Direction	Description of usage
POST	Request	The EMSP sends a command to MOBI.E
POST	Response	Receive execution confirmation from MOBI.E

3.9.3 Commands and Objects Description

3.9.3.1 START_SESSION

MOBI.E shall verify that the token exists and authorize it prior to sending the request to the charging station.

Typically, all charging stations should perform OCPP Authorization prior to starting a new transaction. If allowed by the firmware, charging stations will be configured not to authorize transactions following a remote start, so as to improve overall validation time.

The current status of the EVSE shall not be considered for the CommandResponse as a charging station may not have communicated all the required status changes.

The following table describes the START_SESSION object:

Table 15

Property	Mandatory	Value	Comment
response_url	TRUE		URL for later result
token	TRUE	APP_USER / AD_HOC_USER	Token needs to have been previously created with MOBI.E (even if only a few seconds/minutes earlier).
		RFID	Token needs to have been previously created with MOBI.E. This token is to be used in case the EMSP wants to make sure that the user will be able to start or stop the transaction at the charging station. In case any of the RFID parameters are not correct then the request shall be rejected (e.g. this is not a way of patching the token).
location_id	TRUE		
evse_uid	TRUE		Value should be mandatory as MOBI.E cannot ensure that all charging stations support a request at the charging station level with local selection.
authorization_reference	FALSE		A UUID-type shall be implemented.

For the corresponding CommandResponse, please consider the following matrix.

Table 16

Condition			CommandResponse - result	Message (if applicable)
Token is Valid	EVSE UID exists in location	Charging Station is Online		
TRUE	TRUE	TRUE	ACCEPTED	N/A
*	*	FALSE	REJECTED	The requested charging station is currently offline.
FALSE	*	TRUE	REJECTED	The requested token is invalid.
TRUE	FALSE	TRUE	REJECTED	The requested EVSE UID does not exist in the location.

The token validity check shall consider the following:

- If the token exists then:
  - It must have the same properties
  - It must belong to the requesting party

Finally for the CommandResult the following table applies. Please note that unlike what is stated in the reference document, CommandResult result cannot be ACCEPTED if no StartTransaction.req has been received.

Table 17

Condition						Command Execution Timeout	CommandResult - result	Message (if applicable)
RemoteStartTransaction.conf received	RemoteStartTransaction.conf status	StartTransaction.req received	Session active with the same token	Session active with differed token	EVSE is OutOfService			
TRUE	ACCEPTED	TRUE	*	*	*	FALSE	ACCEPTED	N/A

Condition						Command Execution Timeout	CommandResult - result	Message (if applicable)
RemoteStartTransaction.conf received	RemoteStartTransaction.conf status	StartTransaction.req received	Session active with the same token	Session active with differed token	EVSE is OutOfService			
TRUE	ACCEPTED	TRUE	*	*	*	FALSE	ACCEPTED	[StartTransaction.req Reason]
FALSE	N/A	TRUE	*	*	*	FALSE	ACCEPTED	WARNING! Original ack not received.
TRUE	ACCEPTED	FALSE	*	*	*	TRUE	FAILED	The charging station has not confirmed that it started the transaction.
TRUE	REJECTED	FALSE	TRUE	FALSE	N/A	FALSE	EVSE_OCCUPIED	The current user has an active transaction on the EVSE.
TRUE	REJECTED	FALSE	FALSE	FALSE	TRUE	FALSE	EVSE_INOPERATIVE	The requested EVSE is out of service.
TRUE	REJECTED	FALSE	FALSE	TRUE	N/A	FALSE	EVSE_OCCUPIED	The EVSE is currently occupied.
FALSE	N/A	FALSE	*	*	*	TRUE	TIMEOUT	

3.9.3.2 STOP_SESSION

Property	Value	Mandatory	
response_url		TRUE	URL for later result
session_id		TRUE	

If the given charging station does not support remotely stopping a session, then the following CommandResponse result shall be given: NOT_SUPPORTED.

For the corresponding CommandResponse, please consider the following matrix.

Table 18

Condition				CommandResponse - result	Message (if applicable)
Session Exists	Session is Active	Session is owned by the EMSP	Charging Station is Online		
TRUE	TRUE	TRUE	TRUE	ACCEPTED	N/A
TRUE	TRUE	TRUE	FALSE	REJECTED	The requested session is currently offline.

Condition				CommandResponse - result	Message (if applicable)
Session Exists	**Session is Active**	**Session is owned by the EMSP**	**Charging Station is Online**		
TRUE	TRUE	FALSE	*	REJECTED	The requested session is not owned by the requesting party.
TRUE	FALSE	TRUE	*	REJECTED	The requested session is no longer active.
TRUE	FALSE	FALSE	*	REJECTED	The requested session is not owned by the requesting party.
FALSE	N/A	N/A	*	UNKNOWN_SESSION	N/A

For the CommandResult please consider the following table:

Table 19

Condition				Command Execution Timeout	CommandResult - result	Message (if applicable)
RemoteStopTransaction.conf received	**RemoteStopTransaction.conf status**	**StopTransaction.req received**	**StopTransaction.req Reason**			
TRUE	ACCEPTED	TRUE	Remote OR OCPP 1.5 Charging Station	FALSE	ACCEPTED	N/A
TRUE	ACCEPTED	TRUE	(other than Remote in OCPP 1.6 Charging Stations)	FALSE	ACCEPTED	[StopTransaction.req Reason]
FALSE	N/A	TRUE	*	FALSE	ACCEPTED	Concatenation between: WARNING! Original ack not received + [StopTransaction.req Reason].
TRUE	ACCEPTED	FALSE	N/A	TRUE	FAILED	The charging station has not confirmed that it stopped the transaction.
TRUE	REJECTED	FALSE	N/A	FALSE	FAILED	The charging station has rejected the request.
FALSE	N/A	FALSE	N/A	TRUE	TIMEOUT	

3.9.3.3 UNLOCK_CONNECTOR

The object can be described by the following properties:

Table 20

Property	Value	Mandatory	
response_url		TRUE	URL for later result
location_id		TRUE	
evse_uid		TRUE	
connector_uid		TRUE	

Table 21

Condition			CommandResponse - result	Message (if applicable)
Active Session with EMSP User	No Active Session but Last User belongs to EMSP (less than 24h)	Charging Station is Online		
TRUE	N/A	TRUE	ACCEPTED	N/A
TRUE	N/A	FALSE	REJECTED	Impossible to perform the requested command as the charging station is offline.
FALSE	TRUE	TRUE	ACCEPTED	Warning: the charging session had ended at [stop_timestamp]
FALSE	TRUE	FALSE	REJECTED	Impossible to perform the requested command as the charging station if offline. Warning: the charging session had ended at [stop_timestamp]
FALSE	FALSE	*	REJECTED	There is no valid session owned by the EMSP on the charging station

For the CommandResult please consider the following table for OCPP 1.6 stations:

Table 22

Condition		Command Execution Timeout	CommandResult - result	Message (if applicable)
UnlockConnector.conf received	UnlockConnector.conf status			
TRUE	Unlocked (OCPP 1.6) or Accepted (OCPP 1.5)	FALSE	ACCEPTED	N/A
TRUE	Rejected (OCPP 1.5)	FALSE	REJECTED	N/A
TRUE	UnlockFailed (OCPP 1.6)	FALSE	FAILED	N/A
TRUE	NotSupported (OCPP 1.6)	FALSE	NOT_SUPPORTED	N/A
FALSE	N/A	TRUE	TIMEOUT	N/A

4 Miscellaneous

4.1 OCPI IDs and current compatibility

4.1.1 General remarks

MOBI.E is to be considered as the national issuing authority for all IDs concerning e-mobility.

All the OCPI IDs considered below are to be adopted for OCPI-related data exchanges only. All other interfaces shall continue to

4.1.2 Party ID (according to ISO/IEC-15118)

In addition, to its MOBI.E 4-letter code, an EMSP/CPO shall be assigned an OCPI party_id that follows a 3 (ALPHA/DIGIT) rule. An equivalence table is provided below between these IDs:

Table 23 Tentative equivalency list between MOBI.E codes and OCPI party IDs

Entity Name	MOBI.E Code	OCPI Party ID
Açorcabos, Telecomunicações e Electricidade	ACOR	ACR
Blue Charge	BLUE	BLU
Bluewalk	BLUW	BLW
CAPWATT Services	CAPW	CAP
Cargga Inteligente	CARG	CGG
Circuitos de Inovação	CIRC	CIR
CME	CMEL	CME
Cascais Próxima	CSCP	CSC
DAPE	DAPE	DAP
Digital Charging Solutions	DCSO	DCS
Ecochoice	ECOC	ECO
EDP Comercial	EDPC	EDP
Elergone Energia	ELRG	ELG
EMACOM	EMAC	EMA
EMEL	EMEL	EML
Emobtec	EMOB	EMT
ENAT Energias	ENAT	ENT
Endesa	ENDS	END
Engie	ENGI	ENG
EVCE Power	EVCE	EVC
EV Power	EVPW	EVP
Factor Energia	FACT	FAC
Galpgeste	GLPG	GLG
Galp Power	GLPP	GLP
GRCApp	GRCA	GRC
Helexia II Energy Services	HELX	HLX
Horizondistance	HORZ	HRZ

Entity Name	MOBI.E Code	OCPI Party ID
Iberdrola	IBRD	IBD
IHOME	IHOM	IHM
Image 4 all	IMAG	IMG
Kilometer Low Cost	KLCO	KLC
Less kW	LESS	LSS
Logical Gravity	LOGI	LOG
Loulé Concelho Global	LOUL	LCG
Lusiadaenergia	LUSI	LUS
Luzigás	LUZI	LUZ
Maksu	MAKS	MAK
Mobiletric	MLTR	MLT
MOBI.E (sem operador ou DPC)	MOBI	MOB
Mota-Engil Renewing	MOTA	MOT
NRG - Sistemas de Energia Renováveis	NRGS	NRG
Petroassist	PETR	PET
Prio Energias Top Low Cost	PRIO	PRI
Propel	PROP	PRP
Repsol Portuguesa	REPS	REP
Superfafe – Supermercados	SFAF	SFF
Superguimarães – Supermercados	SGMR	SGM
InterTrofa Supermercados	TROF	TRF
Cooperativa Elétrica de Vale d´Este	VALD	VLD
Veimonte	VEIM	VEI

Please note that this table is tentative, and a final version shall be presented in the final release version of this document (and continuously updated on MOBI.E's website).

4.1.3 EVSE ID (according to eMI3)

For all MOBI.E charging stations, the following structure applies:

<EVSE ID> = <Country Code> <S> <Spot Operator ID> <S> <ID Type> <Power Outlet ID>

- <Country Code> = "PT"
- <Spot Operator ID> is the 3 (ALPHA/DIGIT) party_id mentioned in the previous paragraph
- <S> = "*"
- <ID Type> = "E"
- <Power Outlet ID> = (ALPHA / DIGIT)1 * *30 (1*(ALPHA / DIGIT) / [<S>])

The power outlet ID shall correspond to the naming standard currently used by MOBI.E. Note that all non-alphanumeric characters used in current MOBI.E EVSE naming standards, shall be replaced with "*". In particular, EVSE MOBIE-00001-01 managed by CPO "MOB" should be referred to as: PT*MOB*LSB*00175*01.

Even though, the CPOs should/could be free to define the EVSE structure, it is currently defined by MOBI.E. This may change in the future.

4.1.4 Contract ID (according to eMI3)

<eMA ID> = <Country Code> <Provider ID> <S> <ID Type> <eMA Instance> <S> <Check Digit>

- <Country Code> = “PT”
- <Provider ID> is the 3 (ALPHA/DIGIT) party_id mentioned in 4.1.2
- <S> = “-”
- <ID Type> = “C”
- <eMA Instance> = 8 (ALPHA / DIGIT)
- The check-digit should be calculated according to http://www.ochp.eu/id-validator/.

Each EMSP is completely free to define its 8 alphanumeric structure for its e-mobility contracts.

As an example, an EDP e-mobility contract coded with “1234ABCD” would have a corresponding eMA ID of: PT-EDP-C-1234ABCD-J.