

OCPI

Overview and G²Smart CPO implementation



This documentation is related to the version 2.1.1.RC1 of the OCPI apis. You can download the official documentation here: https://www.nklnederland.com/uploads/files/OCPI_2.1.1-RC1.pdf

OBJECTIVES

OCPI (Open Charge Point Interface) is an API used by EMSP, CPO and interoperability platforms to exchange data, such as locations, charge details records, authorizations, etc.

The objective of this document is to:

- Overview the functionalities of OCPI.
- Describe the OCPI APIs in details in the G²Smart context

OCPI FUNCTIONALITIES

General comments

The documentation describes the topology of electric vehicle charging infrastructure. However, OCPP versions 1.X can be implemented in different manners. So, in some case, the CPO cannot identify which outlet was used in a charging session. This behavior has an impact on several aspects of OCPI:

- Authorizations: EMSP can receive several authorizations for the same tag swipe
- Session data & CDR: G²Smart cannot know which connectors is used.

This constraint have an impact of the global solution because we can't base the customer billing on the outlet because in some case, we cannot have the exact outlet used by him.



With OCPI, we cannot bill the customer by the outlet he used

Point of interest synchronization

All POIs can be synchronized by a request to G²Smart once a day but G²Smart have also the possibility to send an update to the EMSP on every update of the data.

G²Smart will send to the EMSP all the location/evses with this particular EMSP in the settings of the evse.

In OCPI, the related module of POIs synchronization is the location module (page 26).

Availability synchronization

G²Smart can send the availability of an evse, this update may be triggered in 3 ways:

- The status (Ocpp status) of the evse changed
- The communication status of the evse
- The service status of the evse.

The following table shows how G²Smart translate those statuses to the OCPI statuses:

OCPI Status	G²Smart rules
AVAILABLE	Communication status: UP or RECOVERING AND Ocpp status: Available AND Service status: In service
BLOCKED	Never used
CHARGING	Communication status: UP or RECOVERING AND Ocpp status: Charging, Preparing, SuspendedEVSE, SuspendedEV, Finishing AND Service status: In service
INOPERATIVE	Service Status: Scheduled


OUTOFORDER	Service status: Suspended OR Ocpp status: Unavailable
PLANNED	Service Status: Provisioning
REMOVED	Service status: Retired NB: if the emsp settings is removed, the evse/location will no longer appear in the webservices
RESERVED	Communication status: UP or RECOVERING AND Ocpp status: reserved AND Service status: In service
UNKNOWN	Communication status: Down AND Service status: In service


In OCPI, the related module of dynamic data is the location module (page 26).

Customer authorization

G²Smart will ask all the emsps configured for the evse. Is there is several emsps, G²Smart will ask all of them, in real time and in sequence until one EMSP responds that the customer is known (even if the customer is not allowed to charge).


For example, in this case:


CU-SDE-AUT1-28018-1
 CU-SDE-AUT1-28018-1


EVSE


Location
Authon du Perche - Pl. Mairie
 Model
 Diva
 Firmware version
 1.3.2.f1.5.3

CPO
 sde28
 Manufacturer
 G2MOBILITY
 Status
 Available


Telecom


Protocol
 OCPP 1.6 SOAP
 Communication status
 Up

IP address
 10.84.69.47
 Last seen
 8 days ago


Extra info

IMSI
 238028230497573

ICCID
 8945020184542477381


Configuration

EMSP
 Kiwhi, G2M, Gireve

eMI³ ID
 FR'S28*ESDE28*AUT1*B1*P1

The evse is configured for the following emsps: Kiwi, G2M, Gireve. When a user swipe is card on this evse, G²Smart will ask Kiwhi then G2M and then Gireve. If Kiwhi answers to this request that the card is known, then G²Smart will not ask other EMSPs, even if the user cannot charge.

Charging sessions data

G²Smart can send in real time the data of a charging session to the EMSP. It can be useful if the emsp wants to notify its user of the evolution of his charging session.

When G²Smart receives a session update from the evse (such as energy consumed, etc.), it will send to the session update to the emsp concerned by this charging session. The update frequency of the session is dependent of the OCPP configuration of the evse.

G²Smart can also provide the charge status of charging session (end of charge for example), but it is not possible to send this data in OCPI for now.



G²Smart can provide the charge status of a charging session (such as end of charge), but only if an additional module is created

G²Smart will also qualify the validity charging session. This data, called compliance in G²Smart, verify the consistency of a charging session in two axis:

- Technical: if there is all technical information needed and if the data are correct
- Functional: if there is a minimum of kwh delivered or minimum of connection time.



G²Smart can qualify the validity of a charging session (minimum of energy delivered, minimum connection time).

The OCPI module concerned by this data is the session module.

Billing information for charging sessions

The billing information of the session are send by G²Smart in a Charge Detail Records (CDR). A CDR is made when G²Smart have all the needed information of a charging session (the total cost included).

G²Smart will timestamp the CDR for the session. This timestamp may be differ according to the date of the charging session. If an evse lost its communication with G²Smart, it may resend all information about the session later. So for example if the charging session happened in july but the evse send to G²Smart all the information in august, the timestamp of the CDR will be on august. So when the EMSP request for CDR in july, this session will not appear. It will appears in August.

The OCPI module concerned by this data is the cdr module.

Tariff description

G²Smart will send the tariff group to the EMSP with the POIS synchronization. The description of the Tariffs can be more complex than the description made by OCPI.

With the actual OCPI description, the EMSP cannot predict the cost of a charging session because the CPO can change the tariffs at any time.



The tariff description of OCPI has to be improved to be used. G²Smart will not automatically send the tariff description to the EMSP.

Remote actions

The EMSP can do several remote action via G²Smart:

- Remote start / stop
- Reserve an evse for the next 30 minutes.

The OCPI module concerned by this data is the command module.

G²SMART OCPI IMPLEMENTATION

General comments

G²Smart is based on a micro-services architecture. The OCPI services provided to an EMSP will be dedicated to it. So G²Smart have on instance of OCPI webservices for each EMSP.

For all services url, the party_id is G2M.

All dates are in UTC. The expected date format is like 2018-12-21T11:10:34.323+0000

Version information endpoint, Version details endpoint, Credentials

The strategy of the IT architecture of G²Smart is to activate a dedicated OCPI connector for each EMSP, because:

- Information sent to each EMSP can be different.
- We can develop new functionalities for one EMSP without impact on others EMSP.



Version information endpoint and version details endpoint are not implemented because G²Smart has a dedicated connector for each EMSP

G²M will provide the credentials for the EMSP access in the process of going live.



The credentials endpoint is not implemented because the credentials is part of the going live process.

Security

To enhance the security of the webservices, G²Smart will set up an IP filter for its webservices. EMSP can specify an IP, a list of IPs or a range of IPs.

Locations module

Location data:

The address sent by G²Smart is the address provided by the infrastructure's owner. G²Smart does not have any control of the name of the cities.

Property	Card.	G ² Smart context
Id	1	Id of the location
Type	1	Force to UNKNOWN

Name	?	The name of the location
Address	1	Concatenation of street number, street name
City	1	City name (G ² Smart does not have any control of the name of the cities provided by the owners)
postal_code	1	Zip code
Country	1	ISO3 country code
Coordinates	1	Lat, long
related_locations	*	There is no additional locations for now. Roadmap: add the geolocation of the parking lot entrance
Directions	*	There is no directions data for now
Operator	?	Never used
Suboperator	?	Never used
Owner	?	The name of the organization. G ² Smart can provide the emi3 code of the organization (in an additional field uid)
Facilities	*	Never used
time_zone	?	Never used. Roadmap: add timezone on location in G ² Smart
opening_times	?	Never used. Roadmap: add opening hours on location.
charging_when_closed	?	Never used
Images	*	Never used
energy_mix	?	Never used
last_updated	1	The last modification of the static data

Evse data:

Property	Card.	G ² Smart context
Uid	1	Id of the evse
Evse_id	?	Emi3 to the evse
Status	1	See § Availability synchronization
status_schedule	*	Never used
capabilities	*	REMOTE_START_STOP, RESERVABLE by default. G ² Smart will send also CREDIT_CARD_PAYABLE if the emsp EMVCO is set up If OCPi capabilities is set up in the extra info on evse, G ² Smart will send the value of this key (and the value only)
floor_level	?	Never used
coordinates	?	Never used

physical_reference	?	Never used
directions	*	Never used
parking_restrictions	*	Never used
Images	*	Never used
last_updated	1	The last modification of the static data

Connector data:

Property	Card.	G²Smart context
Id	1	
standard	1	
format	1	Force to socket
power_type	1	
voltage	1	
amperage	1	
tariff_id	?	Roadmap: send the service id
terms_and_conditions	?	Never used
last_updated	1	The last modification of the static data

CPO Services

Method	url	Comment
GET	Locations/	Call once a day. With our without pagination
GET	locations/{location_id}	Not yet implemented - Roadmap
GET	locations/{location_id}/{evse_uid}	Not yet implemented - Roadmap
GET	locations/{location_id}/{evse_uid}/{connector_id}	Not yet implemented - Roadmap

EMSP Services

Method	url	Comment
GET	locations/{country_code}/{party_id}/{location_id}	Not used by G²Smart
GET	locations/{country_code}/{party_id}/{location_id}/{evse_uid}	Not used by G²Smart
GET	locations/{country_code}/{party_id}/{location_id}/{evse_uid}/{connector_id}	Not used by G²Smart

PUT	locations/{country_code}/{party_id}/{location_id}	Optional
PUT	locations/{country_code}/{party_id}/{location_id}/{evse_uid}	Optional
PUT	locations/{country_code}/{party_id}/{location_id}/{evse_uid}/{connector_id}	Not used by G2Smart
PATCH	locations/{country_code}/{party_id}/{location_id}	Optional
PATCH	locations/{country_code}/{party_id}/{location_id}/{evse_uid}	Mandatory
PATCH	locations/{country_code}/{party_id}/{location_id}/{evse_uid}/{connector_id}	Not used by G2Smart

Beware of:

- The example of opening hours is not aligned to the data description (field "twentyfourseven" field not exists in data description)

Session module

Session data

Property	Card.	G2Smart context
Id	1	Uuid of the transaction
start_datetime	1	
end_datetime	?	
kwh	1	
auth_id	1	
auth_method	1	
Location	1	Sometimes, G2Smart cannot know the outlet used for the session. In this case, G2Smart will send UNKNOWN on the connector type
meter_id	?	Never used
currency	1	Force to EUR
charging_periods	*	Never used
total_cost	?	Roadmap
Status	1	ACTIVE: when the charging session is started PENDING: Never used COMPLETED: when the charging session is stopped INVALID: Roadmap: invalid compliance.
last_updated	1	Timestamp of the last modification

CPO Services

Method	url	Comment
GET	sessions/	Not yet implemented – Roadmap

EMSP Services

Method	url	Comment
PUT	sessions/{country_code}/{party_id}/{session_id}	Mandatory
PATCH	sessions/{country_code}/{party_id}/{session_id}	Mandatory
GET	sessions/{country_code}/{party_id}/{session_id}	Never used by G ² Smart

CDR module

G²Smart can push the CDR. For the reliability, EMSP may call a GET method once a day

CDR data

Property	Card.	G ² Smart context
Id	1	Uuid of the transaction
start_date_time	1	
stop_date_time	1	
auth_id	1	
auth_method	1	
Location	1	Sometimes, G ² Smart cannot know the outlet used for the session. In this case, G ² Smart will send UNKNOWN on the connector type
meter_id	?	Never used
currency	1	Force to EUR
Tariffs	*	Never used
charging_periods	*	Not yet implemented – Roadmap.
total_cost	1	Roadmap
Total_energy	1	
Total_time	1	
Total_parking_time	?	
Remark	?	

CPO Services

Method	url	Comment
GET	cdrs/	Date from & to mandatory

EMSP Services

Method	url	Comment
GET	cdrs/{cdr_id}	Never used
POST	cdrs/	Mandatory

Tariff module

Not implemented

Token module

G2Smart is using only the real time authorization. So the tokens services will be called when a user swipe his card. If the token is not known by the EMSP, the EMSP **must** reply by a HTTP code 404, otherwise, the charging session will be affected to the EMSP.

CPO Services

Method	url	Comment
GET	tokens/{country_code}/{party_id}/{token_uid}	Never used
PUT	tokens/{country_code}/{party_id}/{token_uid}	Never used
PATCH	tokens/{country_code}/{party_id}/{token_uid}	Never used

EMSP Services

Method	url	Comment
GET	/tokens/?date_from=xxx&date_to=yyy	Never used

POST	tokens/{token_uid}/authorize	<p>Mandatory</p> <p>If the EMSP does not know the token_uid, it must respond by the http code 404 (Not found).</p> <p>Possible reponse for EMSP:</p> <p>ALLOWED: G²Smart will send Accepted</p> <p>BLOCKED: G²Smart will send Blocked</p> <p>EXPIRED: G²Smart will send Blocked</p> <p>NO_CREDIT: G²Smart will send Blocked</p> <p>NOT_ALLOWED: G²Smart will send Blocked</p>
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Commands module

Implemented by G²Smart:

- Reserve now
- Remote start / stop

CPO Services

Method	url	Comment
POST	commands/{command}	<p>Commands allowed:</p> <ul style="list-style-type: none"> • START_SESSION • STOP_SESSION • RESERVE_NOW (careful, there is not cancel reservation in OCPI)