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Charging with OCPP Standards

White paper



What is Open Charge Point Protocol (OCPP) and why do I need to be aware of it?

The Open Charge Alliance, an international non-profit organization advancing open standards for electric vehicle charging infrastructure, developed OCPP with an eye towards a global standard. It is open source, patent-, and royalty-free with no licensing barriers to adoption. As with other standards, OCPP increases customer choice, promotes competition, and reduces the likelihood of stranded assets. Note that utilizing OCPP does not prevent adding additional features in parallel; therefore, use of OCPP does not inhibit innovation.

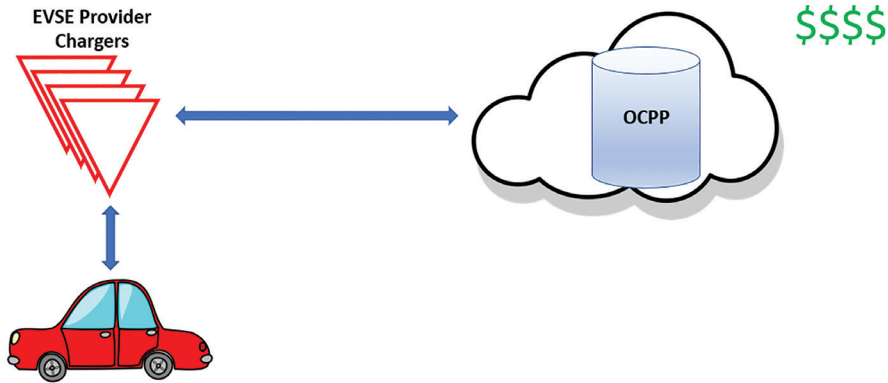
OCPP is a software protocol that defines the rules, syntax, semantics and synchronization of communication and error recovery methods that enables communication between an electric vehicle supply equipment (EVSE), aka electric vehicle chargers, and the central charging data management platform/system/cloud backend (OCPP backend). OCPP offers industry hardware and software a defined protocol for communicating messages between hardware and a central management system without regard for the vendor of either.

Adopted in 78 countries and widely used in the US, this standard assures hardware and cloud management interoperability, an important factor to an EV charging site owner/operator who may want to use a variety of vendors and cloud management solutions. OCPP allows the EV service provider the ability to switch between central data management solutions, as well as use a variety of hardware, and ensures scalability. The EV service provider will be able to "plug and play" across different hardware or data management providers as long as they are OCPP compliant.

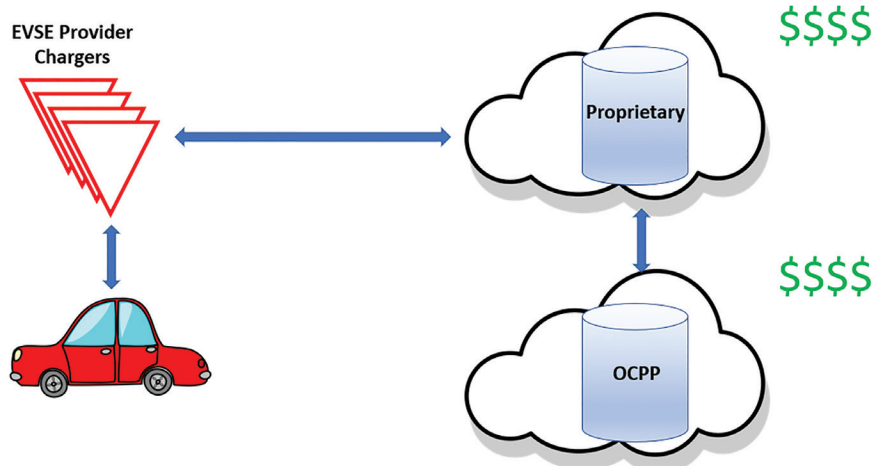
Open Charge Alliance Certification for OCPP 1.6

The Open Charge Alliance now offers a third-party testing process and certificate for OCPP 1.6 which will register a product as a certified OCPP 1.6 compliant implementation and guarantee interoperability between products. The product can either be an EVSE or OCPP backend.

It is OCPP compliant upon being tested and certified by an authorized independent testing lab and demonstrated when the charger can communicate directly with at least two different OCPP compliant networks managing the data/authentication/billing.



When is a network not really OCPP:



It's not OCPP when there is any proprietary software/network between the cloud and any other provider managing the data/billing. In this graphic, a non-OCPP network is depicted--communications from the charger are received by the service provider's cloud via a proprietary protocol and then are translated to OCPP so they can be sent to another cloud that is using OCPP.

Some companies claiming to be OCPP compliant may not really be OCPP compliant. The claim can be made because they have published the application programming interface. They may even claim their hardware is OCPP compliant, but they may still be using proprietary protocols between their hardware and backend network. They may have built an interface between their proprietary protocol and an OCPP server. This interface uses OCPP to communicate the information between the two backend networks, but the primary connection for monitoring and controlling the charger remains the connection on the proprietary protocol, and the charger itself may not be able to be connected to a different provider's OCPP backend. Claiming compliance in this case is misleading and adding expense, sabotaging interoperability and scalability. Both, the hardware and the backend cloud network need to speak OCPP to be truly OCPP compliant and have the interoperability with other OCPP compliant hardware and networks. When there is an intervening proprietary interface of any kind, it is not OCPP compliant, and not open. Ideally, to claim compliance with OCPP an EVSE should be tested for interoperability with two independent OCPP backends and vice versa .

Introducing OCPP 2.0

In April 2018 OCA introduced OCPP 2.0. The added functionality for both OCPP 1.6 and OCPP 2.0 are below:

OCPP 1.6 Improvements over OCPP 1.5 ¹
Smart charging added.
New transport protocol reducing data usage.
End users get more information about the current status of a charging station.
Improved support for JavaScript Object Notation (JSON), improved storage and transport of data.
The ability to send new information to a Central System, such as the State of Charge of an EV is added.
The Central System gets the ability to request information from the charging station.
Remote charging station monitoring made possible.
Enhanced security <ul style="list-style-type: none"> • Secure connection setup • Security events/logging • Secure firmware updates
OCPP 2.0 Improvements over OCPP 1.6 ²
Communications: ³ <ul style="list-style-type: none"> • The ability to communicate the requested energy amount (=the amount of energy in kWh that the vehicle wants to charge).
Device management: <ul style="list-style-type: none"> • Set configurations and monitor a charging station.
Improved transaction handling: <ul style="list-style-type: none"> • Simplifies handling of large numbers of charging stations and transactions.
Added security: <ul style="list-style-type: none"> • Secure firmware updates • Security logging and event notification • Security profiles for authentication (key management for client-side certificates) • Secure communication
Added smart charging functionality: <ul style="list-style-type: none"> • This is for topologies with Energy Management Systems, features a local controller for integrated smart charging and management.
Support for ISO 15118.
Display and messaging support: <ul style="list-style-type: none"> • The EV driver see information on their SmartPhone display such as rates and tariffs.

Each OCPP iteration moves toward a wider array of features and functionality and will one day be adopted globally. Meanwhile, the EV market is gaining acceptance and growing in market share, in part, because of open standards like OCPP.

¹ "OPEN CHARGE POINT PROTOCOL 1.6," Open Charge Alliance, <https://www.openchargealliance.org/protocols/ocpp-16/> Accessed February 14, 2020.

² "OPEN CHARGE POINT PROTOCOL 2.0," Open Charge Alliance, <https://www.openchargealliance.org/protocols/ocpp-20/> Accessed February 14, 2020.

³ Joachim Lohse "A new chapter of EV smart charging — The era of OCPP 2.0," ampcontrol.io, https://medium.com/@joachim_21503/a-new-chapter-of-ev-smart-charging-the-era-of-ocpp-2-0-9f9f0da8962d (November 13, 2019). Leveraged as a grid resource for electric grid reliability by utilities. OCPP offers utilities grid flexibility.

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