PcVue White Paper – Open Charge Point Protocol (OCPP)

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PcVue® Solutions

Content

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1. What is the Open Charge Point Protocol (OCPP)?

OCPP is an IP-based protocol for monitoring, control and diagnostics of charging station infrastructure for electric vehicles (EV).

Its purpose is to create a manufacturer-independent communication between charging stations for electric vehicles and various billing and management systems via an open application protocol. Today, OCPP is used worldwide as a universal communication protocol in the field of charging infrastructure for electric vehicles.

2. SCADA systems and OCPP

Control systems are among the systems with a primary interest in data exchange with EV charging stations. Unlike other stakeholders, such as billing systems, reservation systems, and fleet management systems, SCADA systems have the specific purposes of real-time monitoring, remote control, and (remote) diagnostics and alarming.

Logging of transactions may also be the responsibility of the SCADA system, with at least one third-party system, such as a billing system, usually accessing the transaction database of the control system.

When a SCADA system is used to monitor charging station infrastructure, it becomes a CSMS (Charging Station Management System).

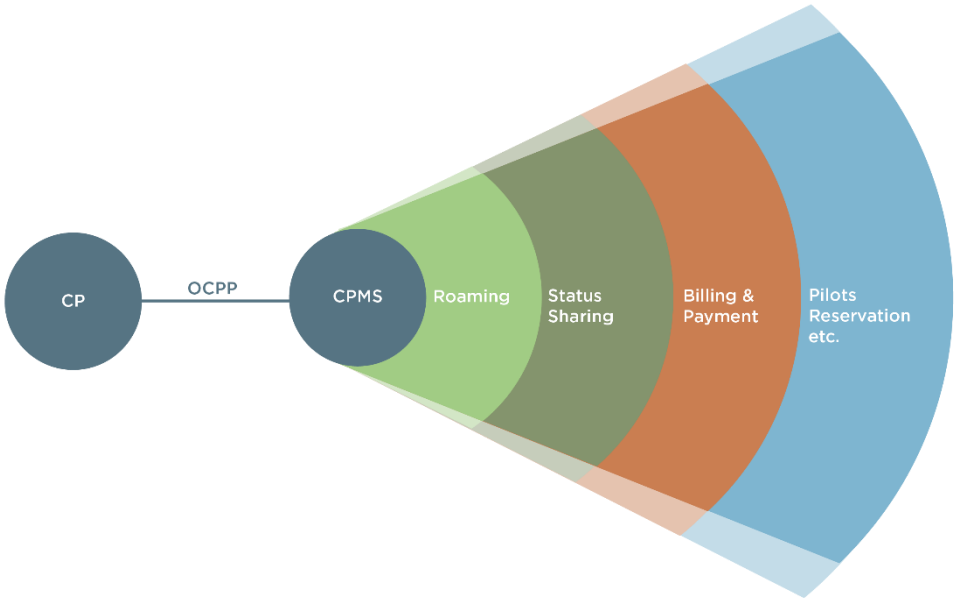

Figure 1 – Typical tasks of a Charging Station Management System (CSMS)

2.1 Which user groups benefit from the central monitoring of the charging station infrastructure?

In many use cases, the central function of the implementation is alarm and operational data management, which allows accurate fault analysis with real time data and historical data. These are the most basic requirements a servicing team has towards a CSMS.

Alarming allows the on-call service to diagnose the fault in advance via remote access and then rectify it or initiate appropriate measures.

In the case of a public transport application, the traffic control center additionally benefits from the connection to the charge point infrastructure.
The dispatcher workstation typically available there shows the whereabouts of a public transport vehicle at the corresponding charging points in real time and points out faults that affect operation. This means that adjustments can be made quickly in vehicle deployment planning to avoid outages or delays on the timetable.

Afterwards, maintenance personnel can determine the actual cause. Alarms of particularly high priority are sent as remote messages to the mobile terminals of the on-call staff.

In case of an application in the field of energy technology, especially in SmartGrid and Redispatch 2.0 applications, the network control center can transmit load profiles and maximum limits for the energy flow to the charge points, depending on the network situation.

All users of the system can monitor active charging processes via a trend data display, whereby all measured values, such as currents, voltages, and power values of a transaction, are visually compared. Likewise, already completed charging processes can be called up from the transaction history and viewed in retrospect, as well as compared with each other. The respective vehicle is identified, and its current charging status is documented.

The transaction history - and, if applicable, the alarm history - is exported at the push of a button or automatically and stored as a weekly and monthly KPI report for the management and consulting departments. Of particular interest here is the respective energy consumption per vehicle and charging process, but also the number of faulty transactions, as well as possible downtimes.

2.2 What about the visualization?

An integrated user interface further enables:

- the display of charging stations as interactive markers on a map control,
- an access management for charging stations,
- locking or unlocking of charging stations,
- remotely activating or cancelling charging processes, and
- storing and retrieving charging station-specific documents.

3. PcVue as a Charging Station Management System

If PcVue is used as a CSMS, the following OCPP feature profiles can be implemented:

Feature Profile	Remark
Core	
RemoteTrigger	
Security Extensions	Security Profile 0 Security Profile 1 Security Profile 2

The following OCPP protocol revisions are supported by PcVue:

Protocol Revision	Remark
OCPP 1.6-J	
OCPP 2.0.1	

PcVue compatibility
The OCPP communication driver is compatible with PcVue 12.0 or later versions.

3.1 How does the integration work?

Together with the PcVue OCPP communication driver, an Application Architect library is delivered that contains ready-made models for charging stations. Via drag-and-drop, different instances of charging stations can be assembled in the familiar environment of the Application Architect, according to their actual configuration and according to the range of functions they support or those that they actually require.

This is the simplest conceivable approach to configuring a PcVue project, considering that this library of OCPP function blocks also includes predefined and pre-animated graphical symbols.
Feedback from project engineers proves that a PcVue project can become OCPP ready in less than 5 minutes!

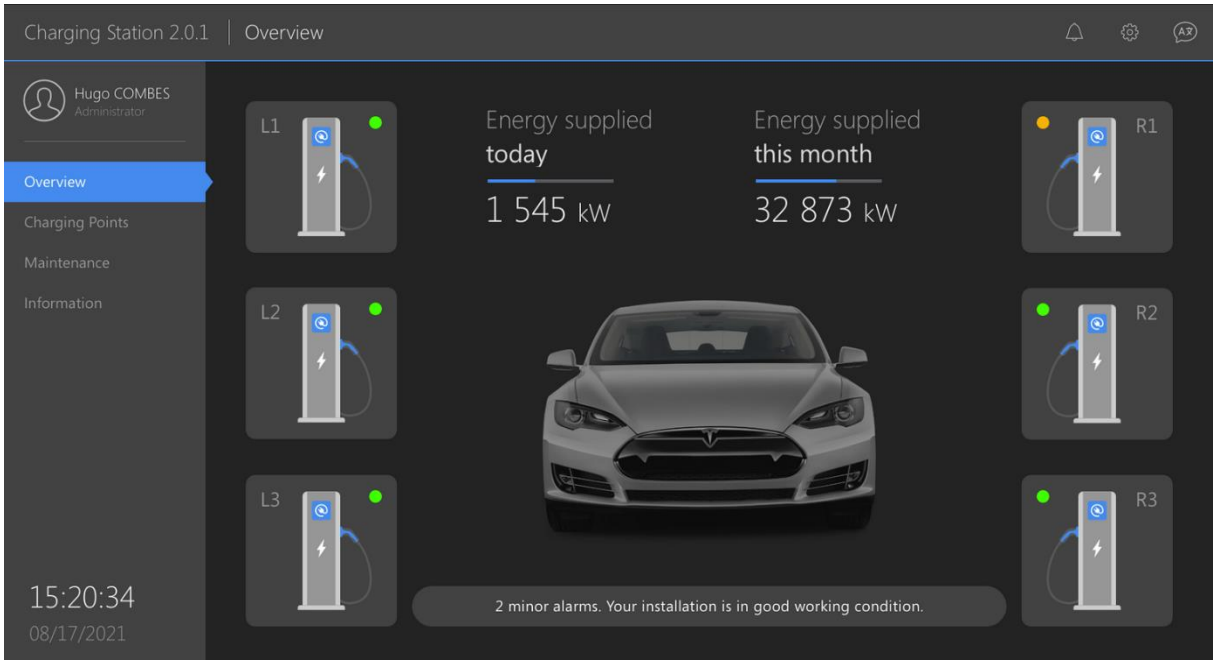

Figure 2 – PcVue OCPP integration

3.2 Which further benefits are there?

The PcVue software also overcomes a typical OCPP problem, which is that a charging station can only communicate with one and only one CSMS. Via a proxy function, the charger's OCPP messages can also be passed on to third-party systems. This represents a typical feature of the open PcVue system, which inherently has a wide range of data exchange options.

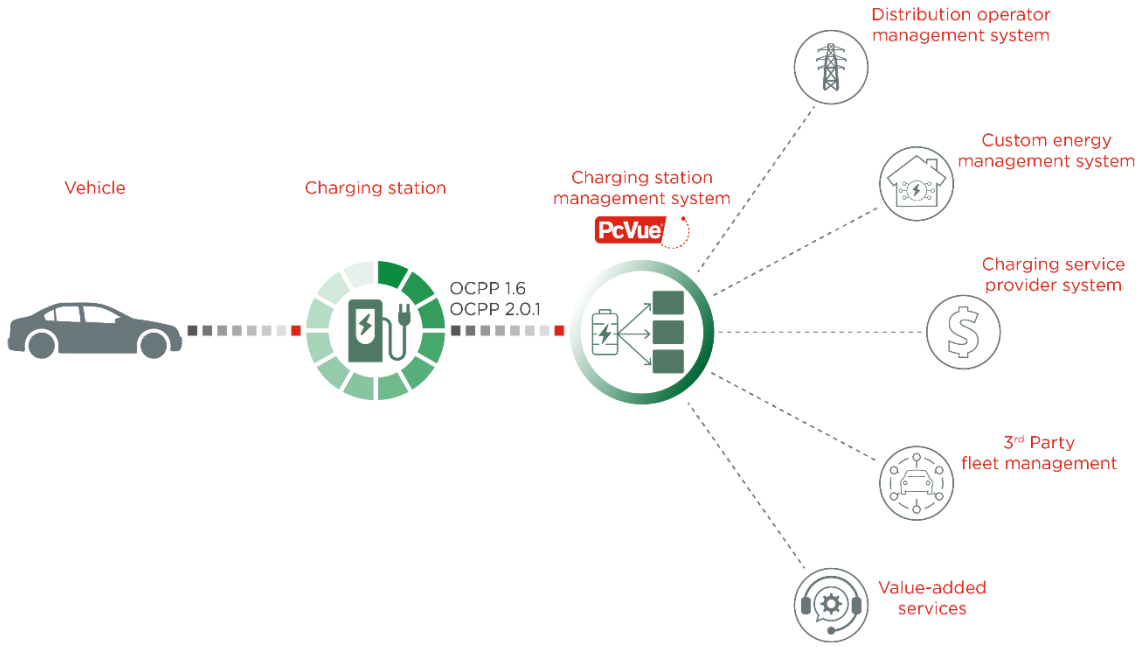

Figure 3 – Passing data to 3rd party systems

It can be assumed that with the deepened application of the Smart Grid, the topic of load management and consequently the Smart Charging functionality of the OCPP protocol will continue to gain in importance. As a certified IEC 61850 and IEC 60870-5-104 telecontrol client, PcVue is already equipped for use in Smart Grid and Smart City projects.
The acceptance of charging stations for payment with credit and debit cards, which is required by law for 2023, offers further opportunities for networking with payment and billing service providers.

3.3 Getting started

Last but not least, PcVue's complete OCPP package is joined by a web based OCPP ChargePoint simulator, with which users can gain their first experience even if a charging station is not immediately available to them, and which can also establish a functioning OCPP communication with a PcVue instance in demo mode. As usual, the test period for the communication is up to 60 minutes.

4. Target audience

4.1 Who is this solution interesting for?

PcVue as a monitoring and control system for charging pole infrastructure is interesting for the following target groups:

- Operators of charge point infrastructure
- Manufacturers of charging stations and charging station equipment
- Operators of EV fleets
- Maintenance service providers
- System integrators and equipment manufacturers in the high and medium voltage sector
- System integrators in the control technology and SCADA sector
- Distribution network operators and utilities

4.2 Fields of application and target branches

A relevant application of the solution can be found in the following sectors:

- Public Transport
- Smart Building (BMS)
- Smart City
- Infrastructure
- Energy

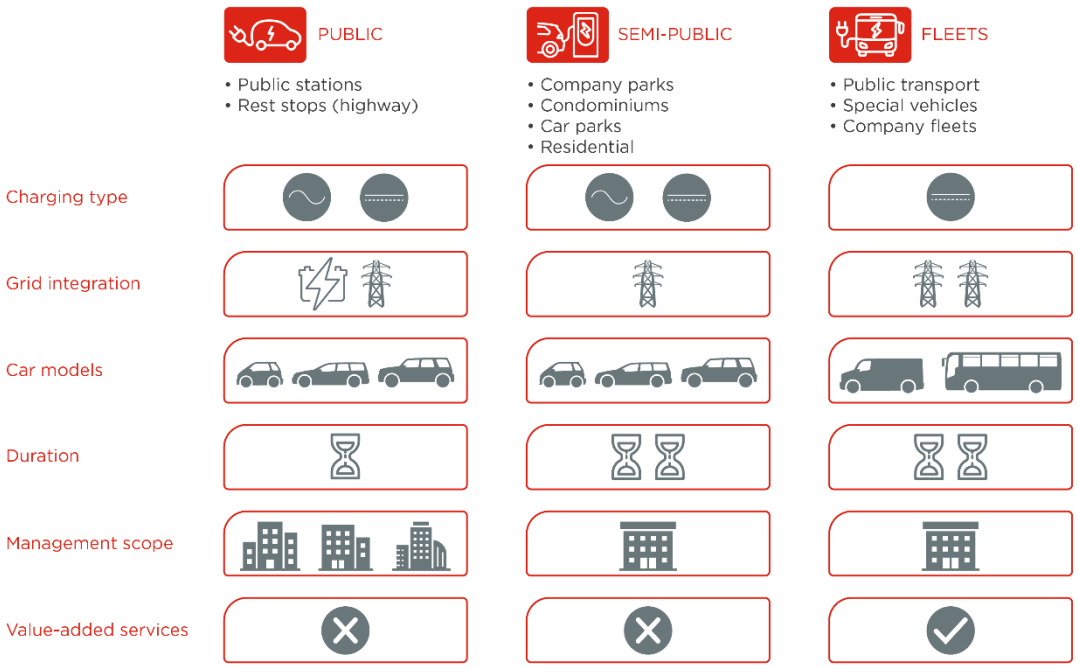

Figure 4 – Fields of application for PcVue as a CSMS