QOCPP-CS - OCPP Stack

Accelerate and make charging station development more reliable

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Trialog has been working on EV charging for more than 10 years, which has allowed us to develop a strong expertise on Electro-Mobility charge protocols like IEC 61851-1, DIN 70121, ISO 15118 and OCPP 1.6/2.0.
In this context, Trialog has developed several communication stacks and validation tools.

QOCPP-CS, the OCPP Communication Stack for Charging Stations is one of these stacks. It provides a robust and reliable communication stack to monitor and control a charging station over **OCPP 1.6** or **OCPP 2.0.**

Supported Features

Supported versions

- OCPP 1.6 WS/JSON
- OCPP 2.0.1
- OCPP 2.1 → Q4 2025

OCPP 1.6 Supported Messages

Functional Block	Coverage	Details
HTTP/SOAP		Not supported. Not planned.
WebSocket/JSON	100%	
Core	100%	
Firmware Management	100%	*Message will be exchanged but no firmware update will be done.*
Local Auth List Management	100%	
Reservation	100%	
SmartCharging	100%	*Applying the ChargingProfile is not the role of the stack.*
Remote Trigger	100%	
Cybersecurity extension	100%	

OCPP 2.0 Supported Messages

Functional Block	Coverage	Details

WebSocket/JSON	100%	
A. Security	100%	
B. Provisionning	100%	
C. Authorization	100%	
D. Local Auth List Management	100%	
E. Transactions	100%	
F. RemoteControl	100%	
G. Availability	100%	
H. Reservation	100%	
I. TariffAndCost		*Not planned yet. Not used.*
J. MeterValues	100%	
K. SmartCharging	100%	*Applying the ChargingProfile is not the role of the stack.*
L. FirmwareManagement	100%	*Message will be exchanged but no firmware update will be done.*
M. ISO 15118 CertificateManagement	100%	
N. Diagnostics	100%	*FTP or HTTP hosting and calls are not the role of the stack.*
O. DisplayMessage	100%	
P. DataTransfer	100%	

OCPP 2.1 support for bidirectional charge is currently under implementation in a prototype demonstrator. It will be available as a licence option in QOCPP-CS.

Technical Details

The QOCPP-CS stack is developed as a C/C++ program using Qt libraries and the OpenSSL library.
Only the LGPL3+ Core, Network and WebSocket libraries of Qt are used, there is no need for a Qt commercial license.
No other open source third party is required.

Linux based OS, C++11 and Qt5.15 are minimal requirements. Both qmake and cmake are supported. Compatible with Qt 6.

QOCPP-CS is compatible with at least Intel and ARM architectures.

Typical target:
- Typical flash usage: 2.2mo for the OCPP library + 6.5mo for Qt Core, Network and WebSocket + your applicative software

- Typical RAM usage: 1.1mo outside of the charging loop, 1.35mo inside the charging loop. (test setup: RAM difference of an EVSE simulator without OCPP and the same EVSE simulator with OCPP)
- Example of compatible hardware:
    - Freescale i.MX287, 200mo RAM
    - RaspberryPi 3

The QOCPP-CS stack is proposing two functional modes, both usable in parallel:

Message mode	Control the stack message per message, for a complete control of the stack behaviour, the API is therefore different between OCPP 1.6 and 2.0.
Use Case mode	Based on the Message mode, control the stack to perform OCPP use cases, and provides the same API for OCPP 1.6 and 2.0. Of course, some use cases are not doable in OCPP 1.6. Trialog is increasing step by step the number and the complexity of use cases and provide access to them thanks to an annual subscription. Depending of your targets, these use cases can either be used as-is (e.g. BootNotification, Transaction, Authorization), or taken as an example to implement your own specific versions of the use case (e.g. Configuration or Firmware management will probably require adaptation to your specific case).

Available use case modules:

Modules	1.6	2.0.1
Authorization	Yes	Yes
Boot	Yes	Yes
Certificate	Yes	Yes
Configuration	Yes	Yes
Diagnostic	Yes	Yes
Firmware	Yes	Yes
Network	No	Yes
Reset	Yes	Yes
SmartCharging	Yes	Yes
Transaction	Yes	Yes

It is possible to implement custom modules or override existing modules.

Validation and Interoperability

The QOCPP-CS stack is ready to use, fully validated with Trialog's expertise and currently under deployement into several charging stations around the world. The stack is regularly used during OCPP plugfests since 2018 (more than 8) in order to provide confidence in its interoperability.

Furthermore, the OCPP stack version 2.0.1 is currently used as one of the two reference implementations to validate the OCPP Test Tool 2.0.1 (OCTT 2.0.1) made by the Open Charge Alliance. The OCTT is used to perform OCPP certification.

QOCPP-CS is used in OCPPvs, Trialog's test tool for CSMS, which is **certified by the OCA for OCPP 2.0.1 Core and Advanced Security profiles**. Addtionally, the certification profiles for **SmartCharging, Local Authorization List, Reservation, and ISO 15118 Certificate Management are planned for Q1 2024**.

The interoperability with the following supervisors has for example been covered using a test environment:

OCPP 1.6	OCPP 2.0
Nexans	ChargeCloud
TotalEVCharge	Driivz
SAP Labs	eDRV
FreshMiles	Meras Plugins
See You Sun	MaxemEnergySolutions
Trialog's QOCPP-CSMS	Sagasystem AS
	TMH
	Vector
	VW Elli
	Zapinamo
	Trialog's QOCPP-CSMS

Contact us

*For more information about **QOCPP-CS, the OCPP Communication Stack for charging station**, please contact us:* emobilitysales@trialog.com*.*