YaCCS SECC - CCS Stack

Accelerate and make CCS developments more reliable

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Version : 10

Trialog has been working on EV charging for more than 10 years and has had several opportunities to develop a strong expertise on Electro-Mobility charging protocols such as 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.

YaCCS, the SECC CCS Communication Stack is one of these stacks. It provides a robust and reliable communication stack to perfom ISO 15118 or DIN 70121 charge with a compatible vehicle over PLC.

Supported Features

Supported versions

- DIN 70121
- ISO 15118-3 / ISO 15118-2
- ISO 15118-20 V2G → provided as an additional option
    - Available today
    - New releases will be provided once more EVs start supporting ISO 15118-20

Supported PLC chipset

- QCA7000/5 from Qualcomm
- ST2100 from IoTecha

Current Status - DIN 70121 / ISO 15118-3 / ISO 15118-2

Functions	Current Status	Details
PLC SLAC	100%	Note: *Listening to BCBToggle is not in the scope of the stack, it is related to the EVSE IEC 61851-1 module.* Note: *Calibrating the PLC power emission on each carrier to -75dBm/Hz is not in the scope of the stack because it depends on the internal hardware and wiring of the EVSE.*
SDP	100%	
TCP	100%	

TLS 1.2	100%	Note: *Providing the relevant certificates and private keys is not in the scope of the stack.*
SupportedAppProtocol	100%	
DC Message Set	100%	
AC Messaget Set	100%	
EIM Message Set	100%	
Plug&Charge Message Set	100%	Note: *Providing the relevant certificates and private keys is not in the scope of the stack.*
SmartCharging	100%	
Renegotiation	100%	
Pause / Resume	100%	Waiting for compatible EV for complete validation. Note: *Listening to BCBToggle is not in the scope of the stack, it is related to the EVSE IEC 61851-1 module.* Note: *Applying X1/X2 is not in the scope of the stack, , it is related to the EVSE IEC 61851-1 module.*

Current Status - ISO 15118-3 / ISO 15118-20

Features	Current status	Details
PLC SLAC	100%	Note: *Listening to BCBToggle is not in the scope of the stack, it is related to the EVSE IEC 61851-1 module.* Note: *Calibrating the PLC power emission on each carrier to -75dBm/Hz is not in the scope of the stack because it depends on the internal hardware and wiring of the EVSE.*
SDP	100%	
TCP	100%	
TLS 1.3 with Mutual Auth	100 %	Note: *Providing the relevant certificates and private keys is not in the scope of the stack.*
SupportedAppProtocol	100 %	
DC Message Set	100 %	
DC Message Set for BPT	100 %	

AC Messaget Set	100 %	
AC Message Set for BPT	100 %	
ACD Message Set	Not included	
WPT Message Set	Not included	
EIM Message Set	100 %	
Plug&Charge Message Set	Release 2024	Note: *Providing the relevant certificates and private keys is not in the scope of the stack.*
Dynamic mode	100 %	
Scheduled mode	Release Q4 2023	
Renegotiation	100 %	
Service Renegotiation	100 %	
Pause / Resume	Release 2024	Note: *Listening to BCBToggle is not in the scope of the stack, it is related to the EVSE IEC 61851-1 module.* Note: *Applying X1/X2 is not in the scope of the stack, it is related to the EVSE IEC 61851-1 module.*

Technical Details

The YaCCS SECC stack is developed as a C/C++ program using Boost libraries and the OpenSSL library for TLS and PnC:
- C++11 is a minimal requirement
- Boost is known to be compatible with at least GCC, C++0x: 4.4.7
- OpenSSL 3 is a minimal requirement to support TLS 1.3 in ISO 15118-20

The YaCCS SECC stack has already been adapted for a Secure Element implementation (custom development for a customer).

The YaCCS SECC stack is regularly used on Linux based OS with kernel 4.9.11 or 5.4:
- Minimal Linux kernel version: 3.4
- Link with the Qualcomm PLC modem using the qcaspi driver of the Linux kernel
- Compatible with at least Intel and ARM architectures

Typical hardware: Freescale i.MX287, RAM 128MB.

Minimum hardware requirement to connect the Qualcomm PLC Modem:
- SPI Bus to connect to the chipset
- 4 GPIOS for chipset configuration
- 3.3V (Pmax 1W)

Note: The ST2100 can only be used on IoTecha hardware. IoTecha is providing the driver license.

Validation and Interopperability

YaCCS is ready to use and has already been deployed by several manufacturers:

- Deployed in more than **1500 DC stations** across France by **2 manufacturers**
  - The numbers could be more since we do not have access to all statistics
- Currently under integration and deployment by **7 more AC and DC manufacturers worldwide**
  - 2 manufacturers are using YaCCS V2G which supports ISO 15118-20
- Deployed in **4 test labs** across Europe for AC and DC charging
  - 3 labs are using YaCCS V2G for ISO 15118-20

YaCCS is fully validated:

- Participated in **3 CharIN Testivals** (2019, 2021, 2022)
- Participated in the first **ISO 15118-20** vTestival
- Tested with Trialog's **ComboCS** test system and **Vector** test systems
  - Partially tested with **Comemso** and **Keysight** test systems during Testivals
- **Regular testing with new cars** in 1 test lab in France (Trialog/W&W)
- **Regular testing with cars** in 1 test lab in Netherland (ElaadNL)

Interoperability testing with following Evs has been conducted within a test environment. Please note that this is merely a brief and incomplete list, provided as an exemple.

AC Charge	DC Charge
Daimler Smart EV ComboCS Porsche Cayenne	VW i3 BWM ID3 Dacia Spring DS3 Crossback e-tense EV ComboCS Fiat e500 Honda e Hyunday Ioniq Hyunday Ioniq 2 Jaguar I-Pace Kia e-Niro Peugeot e-208 Peugeot e-2008 Renault Zoé 2 Tesla model S VW e-UP

Contact us

For more information about **YaCCS, the SECC CCS Communication Stack***, please contact us:* emobilitysales@trialog.com*.*