EVerest: One stack to charge them all?
About me

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Background in computer science and robotics

Working @ PIONIX on EVerest since 2021
About EVerest

- A complete software stack for EV chargers
- Runs on embedded Linux
- Apache 2.0 License
- Aims to support many different HW platforms
  - and you can build your own!
- Includes numerous modules:
  - Board support drivers for AC and DC chargers
    - HLC: SLAC, DIN SPEC 70121 / ISO15118-2/20
    - OCPP 2.0.1 and 1.6
    - Power meters, DC power supplies
- C++17, JavaScript, Python and Rust support
Emerging ecosystem

Standardization bodies

**EVerest**
One Stack to Charge them all!

Component Suppliers
- PHYTEC
- TeleCash
- LUMENISIL Microsystems
- Texas Instruments
- FEIG
- seed studio
- Bender

Charging Station OEMs
- HEY-CHARGE
- Lumen
- MAHLE
- Electric Charging
- quello

E-Mobility Service Providers & Utilities
- WSW
- EAAZE
- Grid & Co.

Academia & Research
- RWTH
- THU
- Fraunhofer ISE
- Marmara University
- KASTEL / KIT

Maker, Hacker & Enthusiasts
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**EVerest TSC**
- PIONIX
- chargebyte

>>20 industrial projects

EVerest compatibility & projects
e.g. ~30 clouds cross-tested
2023: Lots of contributions

Source: insights.lfx.linuxfoundation.org/foundation/lfenergy/overview?project=everest
A fast growing community

Source: lists.lfenergy.org/g/everest
New organizational structure

Breakdown in Working Groups to enable and manage further growth

- 🏎️ Car Communication (eg. ISO15118)
- 🌧️ Cloud Communication (eg. OCPP)
- 🛠️ EVERest Framework & Tools
- 🧪 CI/CD and Testing
- 😞 General and Q&A

Entrypoint for all discussions: 
#EVERest on lfenergy.zulipchat.com
Some 2023 Milestones

- 10 “monthly” source-code releases of everest-core
- 2024.1.0 ❄️ has just been released
- Updates to meta-everest yocto layer (kirkstone) based on these releases

Updated release strategy coming in the next couple of weeks
Some 2023 Milestones

- OCPP 2.0.1 Core & advanced security profile
  - Very active development on OCPP 2.0.1
- OCPP 1.6 continuously improved
- Well tested: DIN SPEC 70121, ISO15118-2 including Plug and Charge (PnC)
  First charging sessions with ISO15118-20 DC
- Attended 2 OCA OCPP plugfests in Arnhem
- Tested ISO15118 at 3 CharIN testivals (Arnhem, Valencia, Cleveland)
AC Open Hardware: YAK + YETI

CERN Open Hardware Licence Version 2 - Permissive

Details:

“EVerest: AC and DC electric vehicle charging with open source software and hardware”
@ FOSDEM 2023
https://archive.fosdem.org/2023/schedule/event/energy_everest/

“EVerest: Electric Vehicle Chargers With Open Hardware and Software”
@ Embedded Open Source Summit 2023

Source: github.com/PionixPublic/reference-hardware
DIY DC Hardware using YETI & YAK

Source: github.com/PionixPublic/reference-hardware
µMWC - Micro Megawatt Charger

- Powered by EVerest, driver included in everest-core
- CCS: up to 1250V, up to 0.8mA, up to 1W
- Local OCPP backend
- Battery Powered
- Full communication and charging session testing
  - incl. isolation monitor etc.
- Additionally: AC protocol testing (without power delivery)

First prototype: early 2023
Finished product: end of 2023
µMWC - Micro Megawatt Charger

- Portable/handheld DC charger
- Easy generation of log files and packet dumps
- Logfiles on EVerest github

Testing Logfiles

This repository contains logfiles from EVerest charging session on different hardware with real cars. Usually it includes EVerest session logs, tcp dumps as well as OCPP logs (if it was used). This repository does not include all cars tested with EVerest, but only log files from dedicated test events at Pionix. Charging sessions were performed with EyseV2G module as HLC implementation unless otherwise noted in the foldername. Qualcomm QCA7k was used as PLC unless noted (some are with Lumissil CG5317).

Legend:

☑️ works correctly, logs included in case of HLC
☒ supported by car but not working with EVerest
☐ not supported by car
☐☐ supports (unofficially) bidirectional charging with EVerest energy manager (limits given in table)
☐☐☐ no logfiles in this repository or support unknown

Fully electric vehicles (European markets)
EV simulation today

- Small electric quad with CCS Port
- Runs EVerest with EV simulation
- ISO15118-2/20 & DIN SPEC 70121 compatible
EV simulation in 2024

- Native C++ car simulator in EVerest
  - DIN 70121 & ISO15118-2 EV Side
  - EvManager
- Including ISO15118-20
  - AC uni- and bidirectional (BPT)
  - DC uni- and bidirectional (BPT)
- First CHAdeMO 1.1 version
Roadmap for 2024 (in no particular order)

- Native C++ EV Simulation
- Complete OCPP 2.0.1 implementation
- Integrate OCPP 2.1 (once the spec has been released)
- ISO 15118-20
  - C++ based EXI parser + parser generator
  - Plug’n Charge
  - AC unidirectional and bidirectional (BPT)
  - DC bidirectional (BPT)
- First CHAdeMO prototype
How to get involved

● **EVerest**
  ○ documentation for details on mailing lists, group chats and working group meetings: [everest.github.io](https://everest.github.io)
  ○ source code: [github.com/EVerest](https://github.com/EVerest)

● **Open hardware**
  ○ [github.com/PionixPublic/reference-hardware](https://github.com/PionixPublic/reference-hardware)
  ○ [github.com/PionixPublic/yeti-firmware](https://github.com/PionixPublic/yeti-firmware)

Looking forward to your engagement and contributions!