

Ideas list for Google Summer of Code contributors for EVerest

EVerest is an open source software stack for EV charging infrastructure. By digitally abstracting the complexity of multiple standards and use cases, EVerest will run on any device from AC home chargers to public DC charging stations. EVerest is developed with modularity and customizability in mind; it consists of a framework to configure several interchangeable modules which are coupled by MQTT with each other.

This project will help to speed the adoption to e-mobility by utilizing all the open source advantages for the EV charging world. It will also enable new features for local energy management, PV-integration, grid friendliness, and many more.

In order to keep hardware requirements low, most modules are written in C++ (ideally 14) or - in some cases - in JavaScript.

Our three ideas which would really help EVerest are based on

1. openADR/USEF Integration (350 hour project)
2. Statistics and Forecasts (175 hour project)
3. Home Automation Integration (350 hour project)

NEW IDEAS FOR 2023:

- Matter support [https://de.wikipedia.org/wiki/Matter_\(Standard\)](https://de.wikipedia.org/wiki/Matter_(Standard)) (supported by Google and others)
- "hey alexa, is my car already charged?" (alexa Integration)

We have created a pool of mentors, you can reach them at mentor@pionix.de

1. OPENADR/USEF integration (350h, medium)

The massive adoption of electric vehicles could be a big threat to the electric grid, just the same way as if everyone would switch on a hair dryer at the same time - we would end up in a blackout, too many cars charging at the same or just at a bad moment could cause some serious issues.

This problems will just get more imminent while we adopt more and more electric vehicles into our economies around the globe. At the same time EVs could also actually help the electric grid by using and storing excess energy in times of high wind or solar production, but little other demand.

In order to make sure cars and other flexible energy consumers always behave in a grid friendly way a couple of methods and procedures have been suggested over the last years, as for example openADR <https://www.openadr.org/> or USEF <https://www.usef.energy>. We are looking for proposals which help implementing one or several such smart grid protocols and mechanisms into the EVerest framework.

2. Statistics and forecasts (175h or 350h, medium)

For leveraging the full potential of smart charging of electric vehicles, it is very crucial to have a good estimate of the near future:

- how much energy will be locally generated
- how much energy will be typically consumed by other devices
- how will energy prices change
- when will the car leave, and how much energy will be needed on its next trip.

Having these and other forecasts available, enables us to choose the optimal settings for the user and achieve the ideal charging result, optimized for prize, charging time, energy usage etc.

We are looking for proposals how such predictions could be implemented into our framework from simple sliding window statistics to advanced AI. We are open to everything which would be robust and scaleable to run on thousands of individual private or commercial chargers.

3. Home automation integration (350h, easy)

Next to heating, security and entertainment, vehicle charging will be another crucial components for future smart homes. Integrating, monitoring as well as combining smart home features with EV charging can greatly improve EV adoption. So having EVerest interact with any smart home management system will be beneficial for all users! So far we have a basic integration with Node-RED <https://nodered.org/> but even extending this would be great!

We are looking for proposals to interconnect EVerest with existing smart home management systems enabling new usecases or just increased comfort for the users. This is not dependent on any specific smart home implementation, just choose your favorite smart home system, or the one you are most comfortable with.

Our ideal contributor:

Ideally you are a software developer with some level of experience, having worked on your own or other projects already. Or you are studying computer sciences or a similar field and want to prove your skills on a real-world project. Hopefully you are as enthusiastic about electric cars as our community is!

Having some coding skills with C++ and/or JavaScript would be essential.

If you are familiar with Flutter, VueJS, NodeJS, and MQTT, that would already qualify you as an ideal contributor. If you are familiar with some of those, but have no clue about the rest, that is also fine.

We do not care where you come from, as long as you have a passion for coding and can help us improve the world a little bit with EVERest!

Proposal

You do not have to write a lengthy essay as a proposal. Ideally you already have some ideas on how you would like to implement some of the things mentioned above and have a structured approach on how to tackle these challenges. This does not need to include technical details. Having a good schedule draft and a clear estimation of your own capabilities will be very much appreciated!

If you are unsure about your approach, feel free to contact our mentors via email at mentor@pionix.de or join the slack channel / mailing list and just ask for help. We will not write the proposal for you, but surely can give you guidelines and direction if needed!

Communication channels and further information

Here is our project site at the Linux Foundation:

<https://www.lfenergy.org/projects/everest/>

From here you have access to our GitHub page:

<https://github.com/EVERest>

and to our mailing list:

<https://lists.lfenergy.org/g/everest>

For a quick start and lots of documentation, check here:

<https://everest.github.io/>

Furthermore we have a slack channel to actively communicate within the community:

lfenergy.slack.com Channel name: #everest

All of the mentors are experienced developers who have worked on this or similar projects for several years already. If you want to get in direct contact with our mentors, feel free to mail them via:

mentor@pionix.de

We are excited about your ideas and your proposals!

If you need any help, do not hesitate to ask for it!

Most importantly: **Have fun!**