SOGNO Project Proposal

General information

Name of project

SOGNO

Project description (what it does, why it is valuable, origin and history)

The energy decarbonisation increases the share of renewables based distributed generation that is connected to the distribution level of grids. Similarly, the electrification of mobility and heating as well as the flexibility offered by customers result in new power profiles and have a large impact on the operation of distribution grids. Network reinforcements are not sufficient any longer to deal with the increasing complexity of distribution systems. The deployment of advanced distribution management systems down to the low voltage network is required.

SOGNO aims at facilitating the transition to a modular microservices based control center software solution for distribution system operators. This allows operators to adapt faster because components can be updated more independently from each other. It provides system operators and automation software developers with an open source framework that exposes open APIs to plug in new automation functions and supports industry standards such as CIM IEC61970 and IEC61850. The vision is to integrate today's SCADA systems with SOGNO and gradually move functionalities into microservices.

A preliminary set of automation functionalities will be provided together with the framework and should be further developed as part of the SOGNO project:
- state-estimation
- load prediction
- voltage control

The functionalities developed as part of the project will not be treated differently from any other SOGNO compatible automation functions developed externally and use the same interfaces.

Due to modules for real-time simulation, the SOGNO project supports a seamless integration of development, testing and deployment. New automation functionalities can be developed and thoroughly tested against a virtual real-time representation of the power system.

Project lead

To be decided by the project's Technical Steering Committee

Project financial sponsor organization(s)

RWTH Aachen University

Names of other key contributing individuals and organizations

- Fraunhofer - Digitale Energie
- Ricerca sul Sistema Energetico - RSE S.p.A.
- RWTH Aachen University
- TSSG, Waterford Institute of Technology
- EU projects: PlatOne, EdgeFlex

Proposed Technical Steering Meeting (TSC) members

Initial TSC members:
Antonello Monti - RWTH/Fraunhofer (amonti@eonerc.rwth-aachen.de)
Markus Mirz - RWTH/Fraunhofer (mmirz@eonerc.rwth-aachen.de)

Existing community links
- repository hosting - initially https://git.rwth-aachen.de/acs/public, later GitHub
- project website and docs - https://git.rwth-aachen.de/acs/public/catalogue/-/blob/doc/doc/README.md
- mailing lists, slack, irc - none yet
- social media accounts - none yet

Link to code base

SOGNO documentation and kubernetes files to set up services:
https://git.rwth-aachen.de/acs/public/catalogue

Preliminary set of automation functions:
- State Estimation
https://git.rwth-aachen.de/acs/public/automation/se
- Load Forecasting
https://git.rwth-aachen.de/acs/public/automation/plf
- Coordinated Voltage Control
https://git.rwth-aachen.de/acs/public/automation/covee

Open source status

Please describe the project's license
Apache 2.0

Is this project's code publicly posted?

Yes

Does this project have ongoing public (or private) technical meetings?
So far, regular private meetings

Do this project's community venues have a code of conduct? If so, what is it?
Plan to adopt LF Energy code of conduct
(https://www.lfenergy.org/community/code-of-conduct/)

Describe the project's leadership team and decision-making process.
None yet

Does this project have public governance (more than just one organization)?
None yet

Does this project have a development schedule and/or release schedule?
None yet

Does this project have dependencies on other open source projects? Which ones?
- Automation functions listed above (state-estimation, load forecasting, voltage control)
- Real-time simulation projects of RWTH (VILLASframework, DPsim)
- FiWare generic enablers
- docker (containerd), kubernetes, helm, RabbitMQ, Grafana
- to be completed

Describe the project's documentation
The documentation will include
- an overview that describes the architecture, what specific solutions were selected and why: virtualization and orchestration, messaging, API gateway, etc.
- a catalogue of automation functions / services that are developed as part of the SOGNO project or that are compatible
- guides and templates to integrate new automation functions / services

Describe any trademarks associated with the project.

None to our knowledge

Project status

Do you have a project roadmap? please attach [Are this project's roadmap and meeting minutes public posted?]
Not yet

Does this project have a legal entity and/or registered trademarks?

No

Has this project been announced or promoted in any press?
The SOGNO software project is one of the results of the SOGNO EU H2020 project. The H2020 project has been promoted in press (https://www.sogno-energy.eu/).

Does this project compete with other open source projects or commercial products?
Concerns that SOGNO might overlap with the LF Energy SEAPATH project have been discussed and it was concluded that the two projects have different goals. SEAPATH is focusing on substation automation at the edge, whereas the focus of SOGNO is on the control center. Besides the testing of automation functions based on real-time simulation does not seem to be part of SEAPATH.

No competing commercial products known. The aim of SOGNO is to integrate with existing SCADA solutions.

Project value

Why would this project be a good candidate for inclusion in LF Energy? Provide a statement on alignment with the mission in the [LF Energy charter](#).

To cope with the drastic changes in power systems explained in the beginning, it is important to develop next generation distribution management systems that can be adapted rapidly. The key factors to enable this rapid adaptation are modularization and open source components that allow stakeholders to focus on the functionalities that they require the most and share development efforts.

What specific need does this project address? Describe how this project impacts the energy industry.

Today, automation software is built in a monolithic way and cannot be extended easily mixing products of different vendors. With more and more new types of equipment, e.g. electric vehicles, being connected to grids, it becomes increasingly difficult to keep up with the resulting requirements on grid automation.

The modular microservices based approach of SOGNO enables a multi-vendor/supplier control center solution and even to develop functionalities together with other stakeholders.

The built-in support for real-time simulation based testing further supports the fast integration of new automation systems since the same environment can be used in testing and operation.

Describe how this project intersects with other LF Energy projects.

See comments on LFE SEAPATH project above.

Who are the potential benefactors of this project? What other organizations in the world should be interested in this project?

The project could be interesting for power system utilities as well as automation system developers and researchers as an open platform to integrate their solutions.

Project needs

How would this project benefit from inclusion in LF Energy

Becoming part of LF Energy, a vendor neutral entity, would make the project more attractive as a platform integrating solutions of multiple vendors and developers contributing directly to the project or compliant modules.

Please describe any infrastructure needs or requests (e.g., web hosting).

None at the moment

Plan for achieving next maturity level (Incubation -> Early Adoption -> Graduated).

The project was tested in several field trials with DSOs. The idea is to provide an MVP that can be used in production within the next 2 years.