LIFENERGY

Annual Review for SOGNO

CLFENERGY Project Annual Review

The Power of Together

SOGNO

Brief Description:

SOGNO creates plug-and-play, cloud-native, micro-services to implement next generation of data-driven monitoring and control systems for grid automation. It simplify the life of utilities by enabling them to optimize their network operations through open source to deliver cost-effectively, and seamless, secure power supply for their customers. SOGNO introduces the idea of grid automation as a modular system in which components can be added through time. This is in opposition to classical monolithic solutions..

TSC Chairperson:

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TSC Members and Affiliations:

Juan Adolfo Galeano, Florian Oppermann, Sanket Gaikwad, Sreejith Pananchickal (RWTH-Aachen University) Markus Mirz (PSI) Federico Paolantoni, Alberto Patrizi, Ciro Cavacchini, Francesco Rizzi, Mattia Alfieri and more (Areti) Varshitha Ramanna, Pranav Kulkarni, Beyza Cizmeci (Fraunhofer FIT)

Key Links:

GitHub: <u>https://github.com/sogno-platform</u> Website:

https://www.lfenergy.org/projects/sogno/

Artwork: N/A

Mailing lists:

https://lists.lfenergy.org/g/SOGNO-TSC

OpenSSF Best Practice Badge URL:

https://www.bestpractices.dev/en/projects /5627

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Contributors are up 🚹 by 25.28% vs. the previous time period.									
					Metric	Contributors	▼		
F	Rank 🔺	 Organization 		Contributors	Change	% Contributions	5		
	1	FWTH ASS	RWTH Aachen University	4	-3	44.44%	6		
	2	Р	Psi Software	2	+1	22.22%	b		
	3		Opal	1	0	11.11%	b		
	4	Z	Zaphiro Technologies	1	0	11.11%	6		
	5	outlender.	Alliander	1	-3	11.11%	6		

Organization Leaderboard 🛈

Contributions:

Contributors 🛈

Active Contributors are **increased by 6.67%** 🔀 vs. the previous time period.



Project Annual Review

RouteVolt: New Service (Integration to EVrich)

Projects: CRETEVALLEY, FLOW

DLFENERG

- EVrich: Identifies available charging points in the specified area, gathers offers from charging station operators, and directs the EV driver to the optimal option based on the current situation.
- RouteVolt: Integrated real-time traffic conditions. New service, which is used as a real-time traffic endpoint for EVrich → to be added to SOGNO soon

Project Annual Review



Proloaf Upgrade

• Version 0.3 under review



- Unify internal data structure, meaning all features are compatible with each other
- Multi feature forecasting
- Saliency map evaluation (explainability method)

PyMFM Upgrade

- Release v0.6
- Revised Architecture.
- Near real time capability
- Improvements to the optimization
- Incoporation of Life measurements

DPsim

Projects: SEGURO, CRETE VALLEY, HYPOWER



New Simulation Models

EMT Ph1/Ph3 components, SSN models (L, C, RLC), Current & Voltage Sources for realtime simulation.

Solver: Matrix Engine Improvements

Unified stamping logic, full matrix support, solver enhancements (KLU/NICSLU).

Real-Time & VILLAS Enhancements

Queueless interface for co-simulation, FPGA closed-loop example, improved logging & sync.

Workflow & CI/CD Upgrades

Improvements in GCC/Clang support, parallel builds, Docker updates, sonarcloud integration.

Testing & Examples

WSCC_9bus decoupling tests, multi-domain (SP/DP/EMT) notebooks, real-time validation.

Code Quality & Maintenance

Full clang-format refactor, structured config files, updated documentation.



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Introduction of Novel Architecture (Prototype)

- Prototype
 - Unified way of data and task
 exchange
 - Expect to tie disparate SOGNO services together
- Central data storage
- Both data and tasks come via Kafka
- Services request missing data,

Providers fulfil requests autonomously



Prototype architecture and preliminary topics

Workshop with LFE on Scaling SOGNO

• Strategic Workshop to attract more DSOs and industry vendors.

Workshop with LFE on modular control systems

- Workshop conducted in context of project OpenEnergyTwin
- Results obtained:
 - Expectations from digitalization of SCADA Systems
 - Architecture modules and improvement potentials
 - Suggestions on Governance of Open-Source Software.

Growth Plan: Roadmap

Category	Feature/Improvement/Cooperation	Planned Quarter	Project
New Features	*New release of Proloaf: Multivariable forecast, Saliency maps, API rework	2025/Q1	
	*New release of Pymfm: Near real-time capabilities. Adding API. Adding measurements to the optimization process.	2025/Q1	Ensure
	Evrich: Real-time traffic conditions integration	2025/Q1	BeFlexible
	Pyvolt: State estimation with data fusion (connect to PMU)	2025/Q2	BeFlexible
	Communication: Add capability to process IEC 104	2025/Q2	OpenEnergyTwin
	CI/CD for core components (Pyvolt, Dpsim, Covee, Evrich) integration testing	2025/Q3	
	Deployment: Create Helmchart for Evrich	To be defined	
	Grid Situational Awareness: Dynamic State Estimator as a micro- service	To be defined	
Improvements	Align versions of dependencies across services/packages (e.g., CIMpy + Pyvolt)	2025/Q1	
	OpenSSF requirements: Best practices	2025/Q2	
	Complete Evrich REST API	To be defined	
	Set uniform Data Management	To be defined	
	Revise communication schema and make it uniform (DPsim + Pyvolt)	To be defined	
Cooperation Opportunities	Explore data ingestion using FledgePower	2025/Q2	OpenEnergyTwin

Growth Plan: Projects

- Evrich with Datafev: will be used in Horizon EU projects.
 - **Beflexible:** EVrich to be utilized in Spanish demo with IBERDROLA.
 - The experiment will assess how optimized charging station selection improves energy distribution and reduces congestion by comparing demand patterns before and after integration.
 - CreteValley: datafev will be utilized to calculate EV flexibility
 - **FLOW:** ARETI will test EVrich in Rome on a simulated residential LV grid
- **HEDGE-IoT:** will utlize ProLoaF for load/production forecasting

Growth Plan: Projects

• InterSCADA (EU project)

- o Develop an open-source software framework for modular SCADA platform
- Will help grid operators maintain system stability in increasingly hybrid AC/DC power grids
- **Open Energy Twin** (RWTH, OFFIS and Fraunhofer):
 - Successfully conducted workshops in collaboration with key industry stakeholders
 - The initiation of Phase 2 preparations and key technologies has been identified based on the inputs.
 - Real-life tests are expected to be conducted

Areas the project could use help on

- Enhance collaboration with other LF projects
 - Exploring opportunities in the field of Data Spaces (OneNet).
 - Connectors to interact with other platforms in the LFE ecosystem (EVerest).
- Growth opportunities:
 - Promoting existing SOGNO services to potential users.
 - Jointly searching funding opportunities for future developments.
- Guidance on management and quality assessment would be highly appreciated

OpenSSF Best Practices



sogno-platform

Projects that follow the best practices below can voluntarily self-certify and show that they've achieved an Open Source Security Foundation (OpenSSF) best practices badge. Show details

If this is your project, please show your badge status on your project page! The badge status looks like this: openssf best practices in progress 75% Here is how to embed it: Show details

These are the passing level criteria. You can also view the silver or gold level criteria.

Expand panels Show all details Show only incomplete criteria

✓ Basics	13/13 🖕
✓ Change Control	9/9 o
✓ Reporting	8/8 🖕
✓ Quality	6/13 •
 ✓ Security 	14/16 •
✓ Analysis	0/8 •

Status of the OpenSSF Badge

- We got access to self-certify
- OpenSSF's certification is a priority in our regular internal meetings
- SOGNO has several repositories and contributors to align
- Verifying non-compliant repositories and disseminating the requirements among colleagues
- We have more manpower now (RWHT+FIT), and we are refining our workflow
- Currently working in Analysis tools
- The Silver Badge is our final target



Feedback on working with LF Energy

- Helps to identify common elements that can then be used as a framework to expand the SOGNO suite more cleanly.
- Motivates to produce reusable, open source, and well-documented code during research projects, thus also improving the transfer of learning.
- Identification and alignment with the industry requirements thanks to the open community environment.
- Automated tools are very helpful: License scan and Insights.
- Reviewing the requirements for best practices gives us a new way of working

TAC Open Discussion

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