



# TAC Meeting

17 January 2023

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# Remembering Shuli



Anyone wishing to leave a memorial can do so at  
<https://github.com/lf-energy/memorials/blob/main/shuli-goodman.md>

Those wishing to make a donation in her memory can do so at  
<https://crowdfunding.lfx.linuxfoundation.org/initiative/aaa421b9-c10b-4e68-9233-26608cf54187>

# Agenda

## Opening (15 Minutes) 5:00 - 5:15 pm

- **Landscape updates**
- **TAC Sponsors for projects**
- **Summary of last TAC and Board meeting**

## TAC Business (75 Minutes) 5:15-6:25 pm

- OpenFIDO Presentation 5:15- 5:35 pm
- Seapath Annual Review 5:35-6:00 pm
- Marketing for Projects 6:00- 6:10 pm

## Closing and Next Meeting (5 Minutes) 6:10- 6:15 pm

# Project Review Cycle

Project	Current Level	Initially Accepted	Last Review Date	Next Review Date
SEAPATH	Incubation	October 6, 2020	November 23, 2021	January 17, 2023
Hyphae	Incubation	December 8, 2020	December 14, 2021	Reschedule
<b>FledgePOWER</b>	<b>Incubation</b>	<b>February 11, 2021</b>	<b>February 15, 2022</b>	<b>February 28, 2023</b>
SOGNO	Early Adoption	October 27, 2020	March 8, 2022	March 21, 2023
OCP Cloud Connector	Sandbox	March 8, 2022		March 21, 2023
Shapeshifter	Incubation	April 6, 2021	April 19, 2022	April 11, 2023
Grid Capacity Map	Incubation	April 27, 2021	July 12, 2022	June 18, 2023
OperatorFabric	Early Adoption	April 30, 2019	June 21, 2022	June 20, 2023
CoMPAS	Incubation	May 5, 2020	July 12, 2022	June 20, 2022
OpenEEmeter	Incubation	June 4, 2019	September 13, 2022	September 26, 2023
GXF	Early Adoption	February 4, 2020	October 4, 2022	October 17, 2023
OpenGEH	Incubation	October 12, 2021	October 4, 2022	October 17, 2023
Arras	Sandbox	July 12, 2022		July 18, 2023
Archimate Working Group	Active	October 4, 2022		October 17, 2023
RTDIP	Sandbox	October 25, 2022		November 7, 2023
OpenSTEF	Incubation	September 21, 2021	October 25, 2022	November 7, 2023
FlexMeasures	Incubation	November 2, 2021	November 15, 2022	November 28, 2023
PowSyBI	Early Adoption	April 30, 2019	November 15, 2022	November 28, 2023
FAWG	Working Group		January 25, 2022	
DAWG	Working Group		January 25, 2022	
Everest	Incubation	October 12, 2021	December 6, 2022	December 19, 2023
OpenLEADR	Incubation	September 15, 2020	December 6, 2022	December 19 2023

# TAC Voting Members

New members in **bold**

<b>Full Name</b>	<b>Account Name</b>	<b>Appointed By</b>
Boris DOLLEY	RTE (Reseau de Transport dElectricite)	Vote of TSC Committee - OperatorFabric
Anne Tilloy	RTE (Reseau de Transport dElectricite)	Vote of TSC Committee - PowSyBI
Carmen Best	Recurve	Vote of TSC Committee - OpenEEmeter
Jonas van den Bogaard	Alliander	Membership Entitlement
Maarten Mulder	Alliander	Vote of TSC Committee - GXF
Benoît Jeanson	RTE (Reseau de Transport dElectricite)	Membership Entitlement
Antonello Monti	RWTH Aachen University	Vote of TSC Committee - SOGNO
Art Pope	Google	Membership Entitlement
Avi Allison	Microsoft	Membership Entitlement
Bryce Bartmann	Shell	Membership Entitlement

# LF Energy Hosted Project and Working Group Leads

Changes in **bold**

Project	Project Lead(s)
PowSyBI	Anne Tilloy, RTE
OperatorFabric	Boris Dolley, RTE
OpenEEmeter	Carmen Best, Recurve
GXF	Maarten Mulder, Alliander
SOGNO	Antonello Monti, RWTH Aachen University
CoMPAS	Frederic Fouseret, RTE & Sander Jansen, Alliander (TAC Representative)
FledgePOWER	Akli Rahmoun, RTE
Hyphae	Asimena Korompili, RWTH Aachen University
openLEADR	Lonneke Driessen & Stan Janssen, OpenADR
SEAPATH	Aurelien Watore, RTE
Grid Capacity Map	Per Lysemose Hansen, Energinet
Shapeshifter	Jelle Wijnja, Alliander
OpenSTEF	Frank Kreuwel, Alliander
Everest	Marco Möller, PIONIX
OpenGEH	Per Lysemose Hansen, Energinet
FlexMeasures	Nicolas Höning, Seita Energy Flexibility B.V.
OCPP Cloud Connector	Rebecca Walkoff, Chargenet
Arras	David Chassin, SLAC
Dynawo	
Full Architecture WG (FAWG)	Benoît Jeanson, RTE
Real Time Data Ingestion Platform (RTDIP)	Bryce Bartmann
Carbon Data Specification Consortium (CDSC)	TBD

# Landscape now with more project info!

We are using the LF Energy Landscape to showcase more project information:

- Mailing List/Slack Channel
- LFX Insights
- SBOM
- Wiki
- TSC Meeting Notes
- Calendar
- Contribution Guidelines

**ACTION: Project leads please review your entry and ensure it is accurate; issue PR for any changes needed.**



LF Energy Early Adoption    LF Project

Open Source Software    License Mozilla Public License

CII Best Practices 25%

Crunchbase	crunchbase.com/organization/lf-energy	more... total: 52
LinkedIn	linkedin.com/company/lf-energy	
Twitter	@LFE_Foundation	Latest Tweet this week
First Commit	5 years ago	Latest Commit 3 weeks ago
Contributors	35	Headcount 1-10
Headquarters	San Francisco, California	
Mailing List	<a href="https://lists.lfenergy.org/g/sogno-discussion">https://lists.lfenergy.org/g/sogno-discussion</a>	
Slack Channel	#sogno	
LFX Insights	<a href="https://insights.lfx.linuxfoundation.org/projects/lfenergy%2Fsogno">https://insights.lfx.linuxfoundation.org/projects/lfenergy%2Fsogno</a>	
Wiki Page	<a href="https://wiki.lfenergy.org/display/HOME/SOGNO">https://wiki.lfenergy.org/display/HOME/SOGNO</a>	
SBOM	<a href="https://github.com/lfscanning/spdx-lfenergy/tree/main/sogno">https://github.com/lfscanning/spdx-lfenergy/tree/main/sogno</a>	
TSC Meeting Notes	<a href="https://github.com/sogno-platform/tsc/tree/master/tsc/meetings">https://github.com/sogno-platform/tsc/tree/master/tsc/meetings</a>	
Calendar	<a href="https://lists.lfenergy.org/g/sogno-tsc/calendar">https://lists.lfenergy.org/g/sogno-tsc/calendar</a>	
Contribution Guidelines	<a href="https://github.com/sogno-platform/tsc/blob/master/CONTRIBUTING.md">https://github.com/sogno-platform/tsc/blob/master/CONTRIBUTING.md</a>	

# TAC Sponsors for Projects

As part of the benefit for LF Energy projects, the TAC has a sponsor for each project.

*“Appointment of an existing TAC member by the TAC that will act as a sponsor of the project and provide recommendations regarding governance best practices.”*

**ASK: Volunteer to be a TAC sponsor for a project**

Project	Current Level	TAC Sponsor
Archimate Working Group	Working Group	
Arras	Sandbox	Antonello Monti
CoMPAS	Incubation	
Carbon Data Specification Consortium	Standards	
Dynawo	Incubation	Art Pope
EVERest	Incubation	
FledgePOWER	Incubation	Benoît Jeanson
FlexMeasures	Incubation	
Full Architecture Working Group (FAWG)	Working Group	
Grid Capacity Map	Incubation	
GXF	Early Adoption	Jonas van den Bogaard
Hyphae	Incubation	Antonello Monti
OCPP Cloud Connector	Sandbox	Bryce Bartmann
OpenEEmeter	Incubation	Carmen Best
OpenGEH	Incubation	
OpenLEADR	Incubation	
OpenSTEF	Incubation	Jonas van den Bogaard
OperatorFabric	Early Adoption	Boris Dolley
PowSyBI	Early Adoption	Anne Tilloy
Real Time Data Ingestion Platform (RTDIP)	Sandbox	
SEAPATH	Incubation	Benoît Jeanson
Shapeshifter	Incubation	Jonas van den Bogaard
SOGNO	Early Adoption	Antonello Monti

# Possible Energy industry TODO Group chapter

- TODO Group ( [todogroup.org](http://todogroup.org) ) is an organization within the Linux Foundation focusing on support and promotion of Open Source Program Offices (OSPOs)
- TODO Group has a community network under the OSPOlogy ( <https://github.com/todogroup/ospology> ) brand, along with numerous chapters for geos
  - Europe is one that Alliander participates in.
- Gauging interest if forming a TODO Group chapter for the Energy industry. Goals would be:
  - Build resources and share best practices for specific OSPO implementations in the Energy industry ( specifically around regulations and standards )
  - Have a networking/mentoring forum for LF Energy member organizations in building their OSPOs

**DISCUSSION: Is this of interest/value?**

# Summary of Last TAC Meeting

- Meeting notes and deck at <https://wiki.lfenergy.org/display/HOME/Technical+Advisory+Council#TechnicalAdvisoryCouncil-MeetingMinutes>

## Updates from the Board

# Agenda

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# OpenFIDO Presentation





# OpenFLUC. Open Framework for Integrated Data Operations Linux Foundation Energy

David P. Chassin, Manager,  
Grid Integration Systems and Mobility  
17 January 2023



SLAC National Accelerator Laboratory  
is operated by Stanford University  
for the U.S. Department of Energy  
under Contract DE-AC02-SF00515



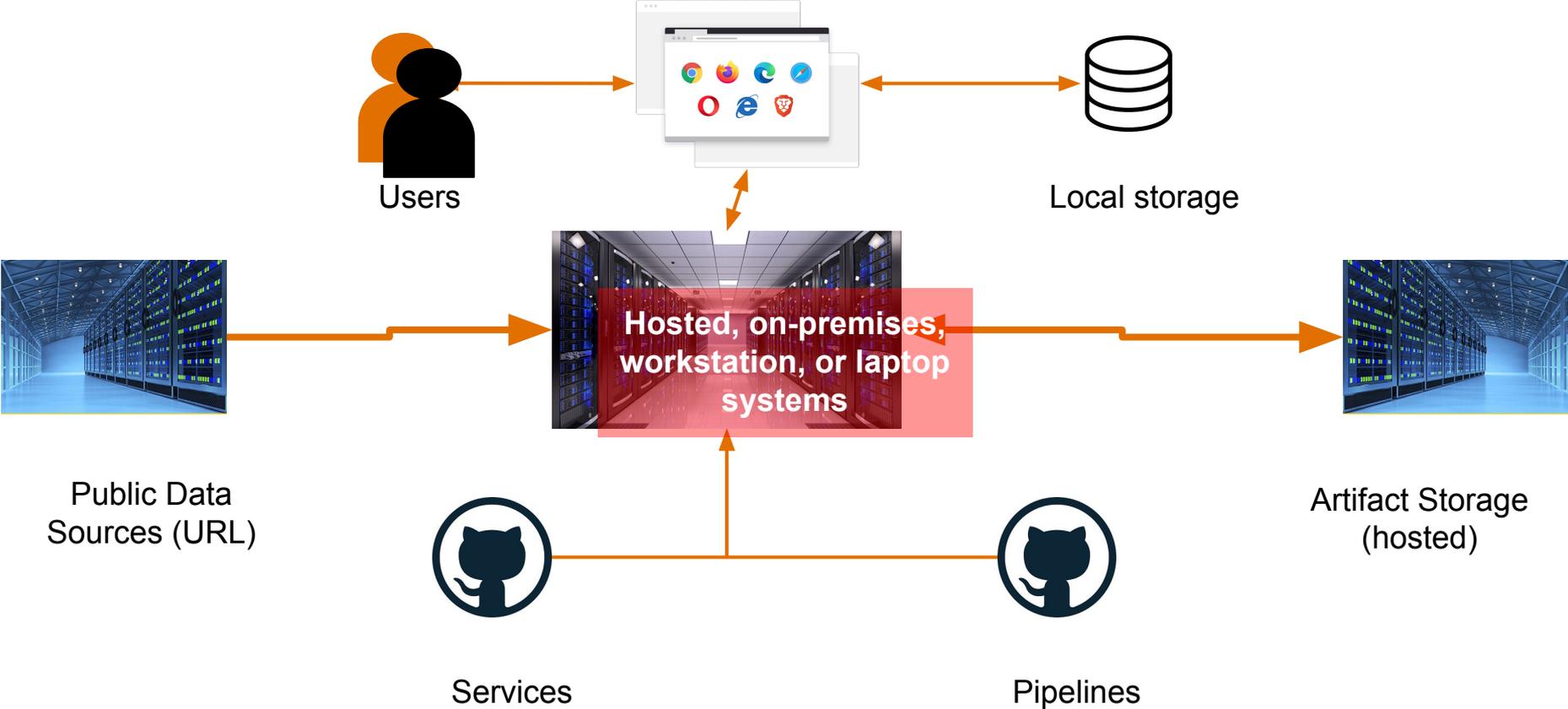
# SLAC National Accelerator Laboratory Grid Integration Systems and Mobility

SLAC

- Run by Stanford University
- Laboratory missions
  - High Energy Physics
  - Photon Science
  - Cosmology
  - **Applied Energy**
- Materials science
  - Batteries
  - Photovoltaics
- **Resource integration**
  - **Load electrification**
  - **Demand response**
  - **Power systems**



# OpenFIDO Technical Approach: Platform architecture



# OpenFIDO Pipeline Examples

The screenshot shows the 'PIPELINES' page in the OpenFIDO application. The left sidebar contains 'PIPELINES', 'USERS', and 'SETTINGS'. The main content area lists several pipelines with their names, last run status, and a 'View Runs' button.

Pipeline Name	Last Run Status	Action
CYME to GridLAB-D converter	Last run completed 7 months ago	View Runs
Electrification		View Runs
GRIP Anticipation	Last run completed a year ago	View Runs
HIPAS GridLAB-D	Last run completed 7 months ago	View Runs
Integration Capacity Analysis	Last run completed 2 years ago	View Runs
Loadshape analysis	Last run completed 3 months ago	View Runs
NERC Load Composition Data	Last run completed 2 years ago	View Runs
Tariff design	Last run failed 6 months ago	View Runs
Weather	Last run completed 6 months ago	View Runs

The screenshot shows the 'Add a pipeline' form in the OpenFIDO application. The form includes a dropdown menu for 'Import from Github', a list of pipeline names, a 'DockerHub Repository' field, a 'Git Clone URL (https)' field, a 'Repository Branch' field, and an 'Entrypoint Script (sh)' field. The 'Add Pipeline' button is highlighted.

Import from Github

- github
- Pole\_resilience
- Pole\_create
- Address
- Census
- Electrification
- Gridlabd
- Resilience
- Hosting\_capacity
- Cyme-extract
- Weather
- Tariff\_design
- Loadshape

stitution pipeline

DockerHub Repository

debian:11

Git Clone URL (https)

https://github.com/openfido/address.git

Repository Branch

main

Entrypoint Script (sh)

openfido.sh

Add Pipeline Cancel

# Pipeline Example 1: Cyme Converter

### START A RUN

Manually fill the "config" form

CYME database(s)   
CYME to network Extract condition   
Timezone locale PST148PDT  
Post processing

network\_graph.png | vobspg\_profile.yay | vobspg\_glm.yay |

Output files  |  |  |

#### GLM Settings

Default nominal voltage (kV)

Network profile

Include files (GLM)

Model file (CSV)

Command options Allocation handling:

#### PNG Settings

Graph filename: network\_graph.png

Image size (Width)

Image size (Height)

Node size (pixels)

Node color:

Font size (pts)

Root node:

Image layout:

Drag and drop your input file here, or [browse](#).

**Start Run**

### PIPELINE RUNS: CYME TO GRIDLAB-D CONVERTER

All Runs: [+ Start a run](#)

**Run #7** Succeeded  
Started At: 4/14/22  
Duration: a few seconds

**Run #6** Succeeded  
Started At: 4/14/22  
Duration: a few seconds

**Run #4** Succeeded  
Started At: 4/14/22  
Duration: a few seconds

**Run #3** Succeeded  
Started At: 4/13/22  
Duration: a few seconds

**Run #2** Succeeded  
Started At: 4/12/22  
Duration: a minute

**Run #1** Failed  
Started At: 4/12/22  
Duration: a minute

#### Overview

**Run #7** Started At: 4/14/22 12:45:55pm  
Completed At: 4/14/22 12:46:12pm  
Duration: a few seconds

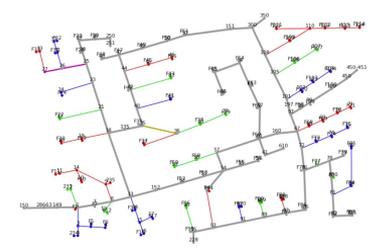
Input Files	Size	Artifacts	Size
<a href="#">config.csv</a>		<a href="#">modify.csv</a>	
<a href="#">settings.csv</a>		<a href="#">index.csv</a>	
<a href="#">modify.csv</a>		<a href="#">IEEE123.zip</a>	
<a href="#">config.glm</a>		<a href="#">settings.csv</a>	
<a href="#">IEEE123.mdb</a>		<a href="#">IEEE123.png</a>	
		<a href="#">IEEE123.json</a>	
		<a href="#">network_graph.png</a>	

### PIPELINE RUNS: CYME TO GRIDLAB-D CONVERTER

Run #7 [Overview](#) [Data Visualization](#) [Console Output](#)

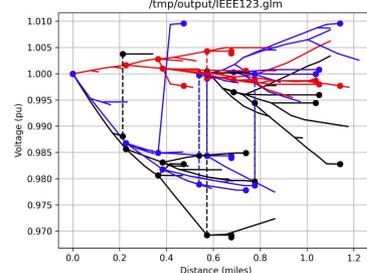
[+ Add a Chart](#)

#### Network graph



#### Voltage profile

/tmp/output/IEEE123.glm



# Pipeline Example 2: Loadshape analysis

### START A RUN

Manually fill the 'config' form

**Input**

AMI data file

**CSV format**

Date/time column(s)

Meter ID column

Water column

Timezone column

Date/time format

**Analysis**

Group count

**Output**

Output loadshape CSV filename

**Plots**

Plot filename

**GridLAB-D**

Load map input CSV

GLM clock output

GLM loads output

GLM schedules

loadid configuration for the Load scale field

**Options**

Enable verbose output

Enable debug output

Drag and drop your input file here, or browse.

## PIPELINE RUNS: LOADSHAPE ANALYSIS

All Runs:

**Run #9**

Started At: 8/9/22

Duration: a minute

**Run #8**

Started At: 5/4/22

Duration: a minute

**Run #7**

Started At: 5/4/22

Duration: a minute

**Run #6**

Started At:

Duration:

**Run #4**

Started At: 4/14/22

Duration: a minute

**Run #2**

Started At: 4/12/22

Duration: a minute

**Overview** Data Visualization Console Output

**Run #9**

Started At: 8/9/22 10:47:50am

Completed At: 8/9/22 10:49:14am

Duration: a minute

**Input Files**

- 
- 
- 

**Size**

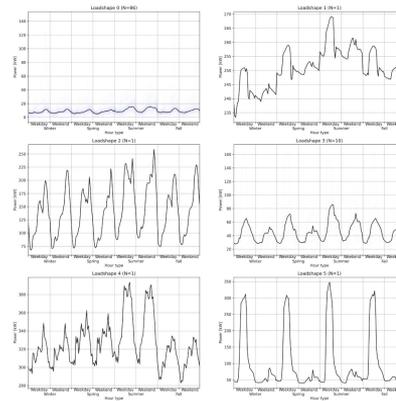
**Artifacts**

- 
- 
- 
- 
- 
- 

## PIPELINE RUNS: LOADSHAPE ANALYSIS

Run #9 **Overview** Data Visualization Console Output

Load shapes



## LoadInsight

- Developed to provide load composition data to NERC

## History

- VADER Prototype (2016-2018)
- Open-source tools by US Department of Energy
- Designed to deliver tools and integrate data streams

## OpenFIDO

- Funded by California Energy Commission (CEC)
- In development at SLAC since 2018
- Collaboration with Hitachi and Southern California Edison

# Key stakeholders and users

SLAC

## US Department of Energy

- National Laboratories (PNNL, NREL, ANL, LLNL, SLAC)

## State Agencies

- California Energy Commission
- California Public Utilities Commission

## Major Utilities

- Southern California Edison
- National Grid

## Academics and Vendors

- Hitachi America Laboratories

# Key Technical Contributors

SLAC



## DOE version

- David Chassin, Berk Serbetcioglu, and Presence PG

## CEC Version

- David Chassin, Derin Serbertcioglu, Alyona Teyber, and Duncan Ragsdale

# Existing Infrastructure

SLAC

## GitHub Organizations

- openfido (general support)
- slacgismo (developers)



## Amazon AWS

- US (\*.openfido.org)

# Relevance to LF Energy

SLAC

## Benefits from inclusion

- Increased visibility
- Support broad adoption
- Stabilize grant funding
- Market guidance
- Technical expertise
- Open-source experience
- Project collaborations

## Good Candidate

- Energy infrastructure
  - Engineering tool
- Focus on major issues
  - Climate response
  - Technology impacts
  - Infrastructure resilience
- Users include
  - Researchers
  - Industry
  - Regulators
  - Policy-makers

# Alignment with LF Energy mission

SLAC

## Fit with LFE Charter

- Direct/manage activities

## Specific Needs

- Awareness and outreach
- Marketing support
- Training users/developers
- OpenFIDO as a platform

## OpenFIDO Relates to Energy

- Energy analytics
- Resource integration
- Distribution analysis
- Demand response
- Climate change
- Market transformation
- Technology adoption

# Open-source tool

- *No use fee/subscription* (academics, agencies, publics)
- *Access to DOE expertise* (community of knowledge)
- *Forward looking models* (technology that are coming)
- *Climate use-cases* (decarb, resilience, hosting capacity)

## Existing use-cases

- Tariff design
- Electrification
- GridLAB-D simulation
- Cyme data extraction
- Grid resilience
- Hosting capacity analysis

## Emerging use-cases

- Transactive energy rates
- Deep electrification
- Decarbonization
- Energy storage solutions
- Climate resilience

## Industry collaborations

- Identify new use-cases
- Develop new capabilities

# Relationship with Other LF Energy projects

SLAC

## Simulation support/cases

- [Arras](#): grid simulation
- [CDS](#): emissions impacts
- [ComPAS](#): DERs
- [EVrest](#): EV charging
- [FledgePower](#): DERs, IoT
- [FlexMeasures](#): DR
- [Grid Capacity Map](#): ICA
- [GXF](#): Transactive Energy
- [Hyphae](#): extreme weather
- [OpenEEmeter](#): load forecast
- [OpenGEH](#): Transactive
- [openLEADR](#): Transactive with OpenADR
- [OpenSTEF](#): MLE solvers
- [PowSyBI](#): open solver links
- [Shapeshifter](#): Transactive

# Potential Beneficiaries

## Researchers

- Earliest adopters; includes National Labs and universities

## Utility planners

- Long term load forecasting, resilience analysis, climate change impacts studies, decarbonization planning

## Utility operators

- Wildfire studies and public safety power shutoffs (PSPS)

## Policy-makers

- CVR/VVC (conservation), DSO+T (transactive energy)

## Regulators

- Tariff design, electrification, resilience, hosting capacity

# Other Potential Interested Parties

SLAC

**Hitachi America Laboratories** (GLOW integration)



**US Department of Energy** (research product delivery)

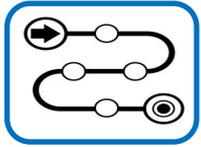


**National Rural Electric** **Association** (Tool integration)



# Future Plans for Growth

SLAC



Roadmapping



Case studies



Training programs



Developer community



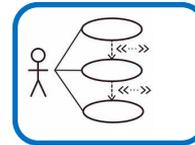
Increased support



Commercialization



New proposals



New use-cases

# Technical Minutiae

SLAC

**Current license:** BSD-3

## Source location

- <https://source.gridlabd.us/>

## Technical Meetings

- Annually in September (hosted by Gridworks)

## Code of Conduct

- DOE Contract for SLAC

## Project leadership

- SLAC PI: David Chassin

## Roadmaps/versions

- Research (DOE)
- Commercial (SLAC)

## Next major releases

- SLAC (early 2023)

## Online documentation

- <https://help.openfido.org/>

# Competition

SLAC

## DOE Labs prohibited from developing products that compete with commercial/industrial products

- No open-source products in power and energy with similar scope and impact

## Multiple Channels to Market Approach

- <https://app.openfido.org/> is a demo of potential platform

# Seapath Annual Review



# OLF ENERGY

## Annual Review for Seapath

# Instructions (REMOVE SLIDE IN FINAL)

Please use this deck in preparation for your project's annual review. Depending upon your project's stage, the review will have different points.

Incubation project:

- Review of progress towards Early Adoption Stage

Early Adoption project:

- Review of progress towards Graduated Stage

Graduated project:

- Review of project maintaining positive growth and adoption

Please use the appropriate section in this deck for building the review deck. Add additional slides for addressing specific review points.

Each project has 20 minutes for both their presentation and Q/A, so plan your presentation accordingly.

# Seapath

## **Brief Description:**

SEAPATH, Software Enabled Automation Platform and Artifacts (THerein), aims at developing a "reference design" and "industrial grade" open source real-time platform that can run virtualized automation and protection applications (for the power grid industry in the first place and potentially beyond). This platform is intended to host multi-provider applications.

## **TSC Chairperson:**

Aurelien Watore ([aurelien.watore@rte-france.com](mailto:aurelien.watore@rte-france.com))

## **TSC Members and Affiliations:**

Eloi Bail (Savoir-faire Linux) / TAC representative

Tony Milne (Advantech)

Ferry Huberts (Locamation)

Sander Janson (Alliander)

## **Contributed by:**

Savoir-faire Linux, RTE, Alliander, GE Renewable Energy

## **Key Links**

**Github:** <https://github.com/seapath>

**Website:** <https://www.lfenergy.org/projects/seapath/>

**Artwork:** N/A

## **Mailing lists:**

- <https://lists.lfenergy.org/g/SEAPATH>
- Slack LFEnergy #seapath (49 members)

## **OpenSSF Best Practice Badge URL:**

<https://bestpractices.coreinfrastructure.org/en/projects/5398>

# Incubation Project review criteria

To be considered for the Incubation Stage, the project must meet the following requirements:

- Have an open and documented technical governance, including:
  - A LICENSE file in every code repository, with the license chosen an [OSI-approved license](#).
  - A README file welcoming new community members to the project and explaining why the project is useful and how to get started.
  - A CONTRIBUTING file explaining to other developers and your community of users how to contribute to the project. The file should explain what types of contributions are needed and how the process works.
  - A CODEOWNERS or COMMITTERS file to define individuals or teams that are responsible for code in a repository; document current project owners and current and emeritus committers.
  - A CODE\_OF\_CONDUCT file that sets the ground rules for participants' behavior associated and helps to facilitate a friendly, welcoming environment. By default projects should leverage the [Linux Foundation Code of Conduct](#) unless an alternate Code of Conduct is approved prior.
  - A RELEASE file that provides documentation on the release methodology, cadence, criteria, etc.
  - A GOVERNANCE file that documents the project's technical governance.
  - A SUPPORT file to let users and developers know about ways to get help with your project.
- Complete and approve the Technical Charter and agree to transfer any relevant trademarks to The Linux Foundation or its affiliate, LF Projects, LLC, and to assist in filing for any relevant unregistered ones.

# Incubation Project review criteria ( continued )

- Have achieved and maintained an [OpenSSF Best Practices Badge](#) at the ['Passing' level](#).
- Have had a successful license scan with any critical issues remedied.
- Have a defined project mission and scope
- An overview of the project's architecture and features defined.
- The project roadmap defined, which should address the following questions.
  - What use cases are possible now?
  - What does the next year look like in terms of additional features and use cases covered?
- Community and contributor growth assessment
  - The current number of contributors and committers, and the number of different organizations contributing to the project.
  - Demonstrate a sustained flow of commits / merged contributions
  - A credible plan for developing a thriving user community, in particular expanding the number of committers and contributors?
  - An outline of the plan for the project to complete the requirements for the Early Adoption stage
- Receive the affirmative majority vote of the TAC.

# Early Adoption Project review criteria

To be considered for the Early Adoption stage, the project must meet the following requirements:

- Demonstrate growth in the project's community, including
  - Growth in the number of commits to the project, number of project committers, and organizational diversity of contributions and committers. [✓]
  - Production or planned production use of the project by at least two independent end users which, in the TAC's judgment, are of adequate quality and scope. [✓]
- Technical Governance of the project is operational, as measured by:
  - A Technical Steering Committee with at least 5 members and a chairperson elected by the members, holding regular open meetings. [✓]
  - Achievement of the OpenSSF Best Practice badge at the ['Silver' Level](#) [✓] [64% completed](#)
- Development of a growth plan, to be done in conjunction with their project mentor(s) at the TAC. This plan should address the following points:
  - Since these metrics can vary significantly depending on the type, scope, and size of a project, the TAC has final judgment over the level of activity that is adequate to meet these criteria. [✓]
  - Release plans for the next 18 months. [✓]
  - Target end-users. [✓]
  - Identification of any regulatory or standards body requirements for deployment, and plans for implementation. [✓]
  - Plans for growth of project contributors and committers to support the growth plan. [✓]
  - Identification of any infrastructure resources needed to fulfill the growth plan [✓]
- Presentation to the TAC of the project's growth, technical governance, and growth plan.
- Receive the affirmative majority vote of the TAC and Governing Board

# Early Adoption/Graduation Project review criteria

To graduate from Incubation or Early Adoption status, or for a new project to join with Graduated status, a project must meet the Early Adoption stage criteria plus:

- Have a defined governing body of at least 5 or more members (owners and core maintainers), of which no more than 1/3 is affiliated with the same employer. In the case there are 5 governing members, 2 may be from the same employer.
- Have fulfilled or are on track to complete the growth plan defined in the Early Adoption stage proposal.
- Have a healthy number of contributions or committers from at least three organizations, with any single organization not composing more than 50% of the contributions or committers. Committers must be identified within the project in a COMMITTERS file.
- Have a public list of project adopters for at least the primary repo (e.g., [ADOPTERS.md](#) or logos on the project website).
- Achievement of the OpenSSF Best Practices badge at the ['Gold' level](#).
- Present to the TAC and the Governing Board on the fulfillment of these requirements.
- Receive a  $\frac{2}{3}$  majority vote from the TAC and a majority vote of the Governing Board to move to the Graduated stage.

Projects can move directly from Incubation to Graduated status if they can demonstrate sufficient maturity and have met all requirements.

# Contributions [1/2]

## Project Trends

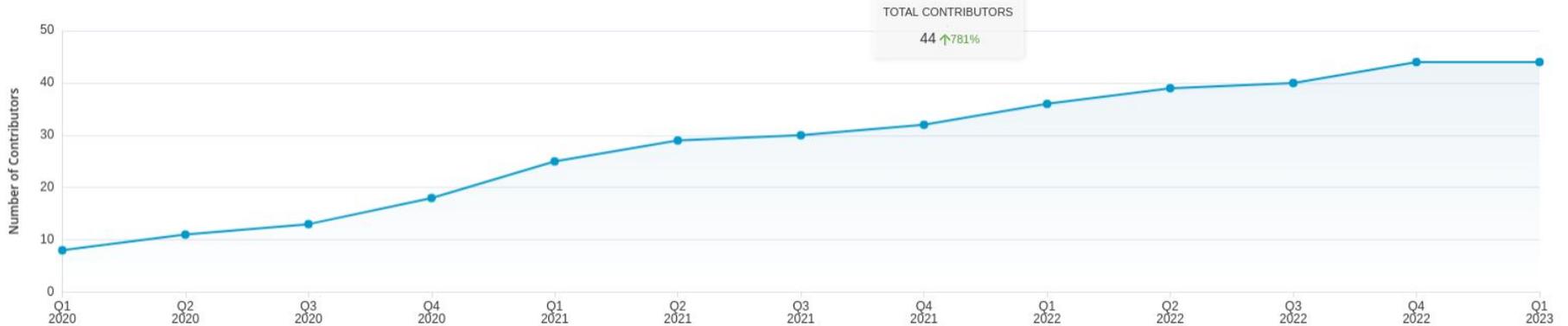


Share

Past 3 Years

### Contributor Strength

Unique aggregate contributors across all hosted projects.



# Contributions [2/2]

Home / LF Energy (LFE) / SEAPATH / Technical Contributors / Organizations

You are using the NEW Insights! [Go back to the previous version.](#)

## Organizations

[Past 3 Years](#)

 [Share](#)

Top 10 Organizations Order by:

Name	Logo	Contributors	Last Activity	Commits	LOC Added	LOC Deleted	Pull Request Activities	Issue Activities
Savoir-faire Linux		9	12/20/2022	1.23K	65.24K	31.73K	434	48
RTE (Reseau de Transport d'Electricite)		3	12/19/2022	222	20.27K	3.13K	342	14
International Business Machines Corporation		1	10/07/2020	3	0	0	0	0
Linaro Limited		1	12/08/2021	2	31	4	19	10
BBC		1	12/03/2021	1	2	0	0	0

# Organizations contributing and/or using in production



GE Renewable Energy

# Key Achievements in the past year

- Full configuration of real-time cluster based on Ansible playbooks
- Use of Seapath with several industrial companies
  - Manage to run several critical applications
  - Plan to use it in production in 2023
- Enhance IT tooling
- Cybersecurity ANSSI
- Creation of Seapath-debian
  - Add the ability to use Seapath with pre-built packages

# Keys achievements [1/2]

Functionalities	Branch	Feature Description	Status
<b>Ability to host virtual machines that can run real-time applications</b>			
Linux OS with real time kernel and KVM	Debia...		done
Customize the Linux OS to ensure the real-time behavior of virtual machines	Debia...	in yocto it's is done during the configuration of the image, before it's is build from source code. In debian it is a ansible playbook that is applied once the image is installed	done
Prepare the system to isolate resources from real time machine	Debia...	it's done by applying ansible playbooks and using	done
Monitor the performance with dedicated tools	Debia...	cyclictest are included in the CI and are launch through a playbook	on going
Write a white paper on the subject	Debia...	white paper that explain the strategy	not started
<b>Ensuring Security and Compliance through Access to Necessary Tools and Resources</b>			
Hardening of the OS (yocto)	Yocto	compliant with lots of requirements of the french ANSII NT28 standard. Test has been added to validate the behaviour	done
Hardening of the OS (debian)	Debian	où sont les tests ?	on going
	Debia...		on going
<b>Implementing High Availability Cluster Feature for Resources (Virtual Machines, Virtual Networks, Storage)</b>			
Cluster	Debia...	based on corosync and pacemaker	done
Distributed storage	Debia...	based on Ceph and rbd	done
Recommended architecture for 3 nodes	Debia...	architecture in triangle without external switches	done
<b>Capability to Automatically Track and Evaluate the Impacts of Modifications on the Platform through Extensive Testing</b>			
CI yocto	Debia...	tests are done by launching ansible playbooks via jenkins each time there is a change on the meta-seapath repo	done
CI debian	Debian	redesign of the CI with github action and integration of business tests (IEC61850)	on going
<b>Ensuring Remote Monitoring, Supervision, and Administration of the Platform</b>			
Deploy and configure the cluster	Debia...	the deployment is deployed with ansible. All that is needed is to install the OS on each machine and to complete the inventories	done
Deploy and configure the virtual networks	Debia...	the configuration of Ovs is done with ansible	done
Monitor the state of the cluster	Debia...	the monitoring is done via SNMP	done
<b>Facilitating Consistent and Standardized Remote Deployment of Updates on the Platform</b>			
Snapshot the system with LVM + APT	Debian	it is possible to make a snapshot of the system before updating it	done
A / B system update with swupdate and hawkbit	Yocto	A/B partition strategy and rollback in case of failure	done
<b>Ensuring High Performance and Accurate Delay and Jitter Prediction in the Virtual Network</b>			
Benchmark and test of the different solutions eBPF,SR-IOV,DPDK	Debia...	Comparative studies has been made and several solutions could be implemented	done
Specify a solution depending on the performance needed and implement it in the platform	Debia...	proposed a solution that have the minimum level of complexity while ensuring the performance needed for IEC61850 SV streams and a low footprint	on going
Implement of the specified solution	Debia...		not started

# Keys achievements [2/2]

Facilitating Easy Deployment of Virtual Machines for Users through Clear Guidelines and User-Friendly Tools			
Create VMs	Debia...		done
Start/Stop VMs	Debia...		done
Disable/Enable VMs	Debia...	The vm-manager tool is used to manage virtual machines within a cluster, and it is capable of handling various functionalities. Additionally, Ansible can be used to automate the actions of vm-manager, enabling the simultaneous management of multiple VMs	done
Deploy multiple VMs	Debia...		done
Allowing Users to View and Modify Current Configuration of Virtual Machines and Handle Rollbacks as Needed			
Create and manage snapshot of a VM	Debia...		done
create/delete colocation constraint	Debia...		done
edit_metadata of a VM that is running in the cluster	Debia...	The vm-manager tool is used to manage virtual machines within a cluster, and it is capable of handling various functionalities. Additionally, Ansible can be used to automate the actions of vm-manager, enabling the simultaneous management of multiple VMs.	done
List Clone/Print status	Debia...	In complement the tool edit_metadata is a graphical tools that can be used to edit the xml file of a VM running in the cluster	done
Ensuring Hardware-Agnosticism and Independence from Specific Hardware on the Platform			
Validate if a specific hardware meets the requirements in term of performance	Debia...	Even if we minimized dependencies they are minimum requirements regarding the CPU, and the capability of NIC (SR-IOV) A lab is needed with a CI and advanced testing to be able to give a liste of material that are compliants	on going
Implementing Strong and Reliable Time Synchronization Based on Precision Time Protocol (PTP)			
Benchmark and test of several solutions	Debia...	The host has to be sync in ptp and the guest sync to the host clock with the PHC and ptpkvm. However the guest also need to retrieve the status of the sync of the host. It can be done through vsock or share folder	done
Create a White Paper on the subject	Debia...		not started
Ensuring Scalability and Optimal Performance for Small Systems and Large Clusters			
Minimize the footprint of the host	Debia...	Work has been done to minimize the load average of the host OS. The 2 OS (yocto and debian ) have a similar footprint	on going
Minimize the footprint of guests/VM	Debia...	The approach is to give the guests only what's needed to achieve the requiered performances. It this way it differs from conventionnal realtime approach	on going
Minimize the footprint of the network / virtual network	Debia...	Avoid dedicated full CPUs, filtering and so on	on going
Cybersecurity			
UserGroup management	Debia...	Manage with ansible	done
Service minimisation	Yocto	image minimal in yocto, work in progress for debian	on going
Network access restrictions	Yocto	Ovs restrictions for yocto, work in progress for debian	on going
CI Testing	Yocto	Implementend for yocto, work in progress for debian	on going
Tools and guidelines to be compliant with national and international cybersecurity age	Debia...	work in progress to first match with ANSSI criterias	on going

# Growth Plan

- Install Seapath **in a real substation** (without protection application)
- **Multiply POC** in utilities
- **Enhance testing** with industry real use cases linked to Seapath Github to test:
  - Realtime, Cybersecurity, Cluster
  - VM that includes tools to do IEC61850 tests specifically Sample Values
- 
  - ✓ Make Seapath as a reference test platform
  - ✓ R&D partnership to create full multi-vendor virtualized digital substation based on Seapath
- Write **white papers** about
  - Networking: state of the art on networking for virtualization to match low consumption and performance
  - Cybersecurity: policy and test developed based an ANSI standard
- 
  - ✓ Share the state of the art
- Configuration tools to **adapt Seapath for all substation configurations**

# Areas the project could use help on

- Give more exposure to the Seapath project
- Enhance the collaboration with other LF Energy projects

# Feedback on working with LF Energy

- LF Energy provides a clear governance to
  - ✓ Facilitate the open sourcing of code
  - ✓ Enrol industrials to use / collaborate
  -
- TSC / TAC provides the an international framework of industrial collaboration

# TAC Open Discussion

OLFENERGY

# Seapath Annual Review



# Marketing for Projects



# Marketing and PR Updates

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- Digital transformation readiness research survey is closed; analysis in process
- Energy Devroom secured at FOSDEM, Saturday, February 4, 2023 - both in person in Brussels and virtual
- LF Energy table at State of Open Con - Feb 7-8 in London
- Opportunity to attend Tech for Climate Action in Washington, DC on March 16 at no cost:  
<http://www.techforclimateaction.com/us>
- Owned 2023 Events
  - SustainabilityCon at Open Source Summit
    - May 10-12 - Vancouver; Sept 19-21 - Bilbao
  - LF Energy Summit
    - June 1-2 - Paris, hosted by RTE
    - CFP open through Feb 17 - submit a proposal at  
<https://events.linuxfoundation.org/lfenergysummit/>
    - Sponsorships available; reach out to Dan to book
  - Embedded Open Source Summit
    - June 27-30 - Prague (Will include a one-day LF Energy track focused on our embedded projects)
- Outreach committee kickoff meeting on Jan 26 - if your organization has not appointed a member let Dan know ASAP
- New form now available for all comms/marketing requests (blogs, videos, case studies, etc.):  
<https://github.com/lf-energy/foundation/issues/new/choose>

# Agenda

## Opening (15 Minutes) 5:00 - 5:15 pm

- Landscape updates
- TAC Sponsors for projects
- Summary of last TAC and Board meeting

## TAC Business (75 Minutes) 5:15-6:25 pm

- OpenFIDO Presentation 5:15- 5:35 pm
- Seapath Annual Review Annual Review 5:35-6:00 pm
- Marketing for Projects 6:00- 6:10 pm

## Closing and Next Meeting (5 Minutes) 6:10- 6:15 pm

# Next TAC Meeting

The next meeting of the LF Energy TAC is scheduled for 7 February 2023 at 8:00 am US Pacific Time/11:00 am US Eastern Time/5:00 pm Central European Time.

**NOTE:** *New meeting invite for series titled 'LF Energy TAC meeting ( 2023 )' from 'LF Energy (LFE) - Meetings <[meetings@lfx.linuxfoundation.org](mailto:meetings@lfx.linuxfoundation.org)>'. Register for meeting at: <https://zoom-lfx.platform.linuxfoundation.org/meeting/98588947265>*  
Please remove all other meeting invites.

## **Agenda will include:**

- Recap of last TAC
- FledgePOWER Annual Review
- Hyphae Annual Review



Thank you!