OpenFIDO: Open Framework for Integrated Data Operations

CEC EPC 17-047 Fact Sheet

Last revised: 1 June 2023
SLAC National Accelerator Laboratory

The Issue

In California, utilities, customer and consulting engineers and regulators need to exchange power system data to validate distributed energy resource plans, obtain permits, and verify compliance when integrating these resources in distribution systems. The data exchange process between the many different tools used can be cumbersome, slow and error prone. This raises a barrier to fast and effective resource planning and integration, which limits the growth of these resources and constrains how quickly California can decarbonize its electric power infrastructure.

Project Description

OpenFIDO is a data interchange, synthesis and analysis platform that provides information exchange between widely used power system analysis and simulation tools such as CYME and GridLAB-D. OpenFIDO can transfer models and data between tools that are part of the suite of tools widely used by utilities, distributed energy resource (DER) engineers and regulators in California. OpenFIDO is designed for system planners, engineers, and analysts who need to quickly and reliably move data from one application to another as part of their regular activities. OpenFIDO also supports emerging user groups such as DER system integrators and aggregators that rely on diverse tools to manage the impact of DERs, as well as governments and agencies that use these models in identifying opportunities for clean energy deployments, addressing system resilience to extreme weather events, and mitigate the impact wildfires.

The goal of OpenFIDO are to enable full interoperability between open-source software such as GridLAB-D and OpenDSS and various commercial power distribution system modeling tools such as CYME, Opal-RT, and RTDS. In addition, OpenFIDO enables easy development and adoption of new tools and analysis methodologies that depend on many diverse public and proprietary datasets for weather, demographic, system telemetry, tariff and market data, and other data collection programs run by utilities, regulators, and commercial entities.

The objectives of the OpenFIDO project are:

1. *Produce a widely usable and fully functional data platform and interoperability layer for various power systems tools*. Southern California Edison deployed OpenFIDO and conducted an evaluation to support regulatory, planning, and operations activities.

SLAC National Accelerator Laboratory is operated for the US Department of Energy by Stanford University under Contract No. DE-AC02-76-SF00515.

2. *Deliver a data exchange platform along with a set of data adapters* to convert data from power systems tools' schema to a standardized, open-source format. Southern California Edison deployed OpenFIDO to convert Cyme models to GridLAB-D format for use in various analyses required to respond to emerging climate change mitigation challenges.
3. *Establish the foundation for long-term user and developer support*, including tools and services for data import, transformation, storage, access, and export. Several utilities have use OpenFIDO for load forecasting, resilience analysis, electrification, tariff design, and hosting capacity analysis.

Benefits for California

Southern California Edison (SCE) uses OpenFIDO to run its Comprehensive Hazards Assessment Tool (CHAT) to demonstrate a GIS addon based on a database of known fragilities, FEMA P-5, Global Earthquake Model (GEM), and climate fragility functions. The US Department of Energy's Grid Resilience Intelligence Platform (GRIP) demonstrates high-wind hazards for distribution poles and primary conductor contact with vegetation, with particular attention to supporting business planning and operations related to high-wind, high-heat, and wild-fire mitigation. According to SCE, the current estimated repair and recovery rate from a seismic event based on the repair rate from the Ridgecrest Earthquake sequence is 30 man-hours per repair to fully restore a distribution circuit to as-built conditions. CHAT running on OpenFIDO helps SCE harden the grid where hazards are most likely to occur and reduce the repair frequencies and durations. Specific improvements observed include:

- Climate adaptation strategies through simulation and evaluation of distribution wood pole performance, and vegetation with primary conductor contact under extreme wind conditions to assess risk.
- Reliability, safety, and wildfire risk planning for improvements in pole and primary conductor risk analysis and operational practices.
- Vegetation planning and operational practices.
- PSPS planning models based on pole and conductor risks.

Project Specifics

Contractor: SLAC National Accelerator Laboratory, Menlo Park CA

Partners: GridWorks, Oakland CA (subcontractor)
Pacific Northwest National Laboratory (subcontractor)
National Grid, Hicksville NY (cost-sharing partner)

Amount: $1,000,000

Co-funding: $30,000 (cost-share)

Term: June 2018 to September 2023

Contact: David P. Chassin (dchassin@slac.stanford.edu)