

OpenFIDO

4.1.1: Testing and Validation Presentation

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Presentation Outline

Review OpenFIDO status of the following:

1. Stakeholder, user, TAC, external testing coordination
2. Data import/export code functional verification
3. Import/export error identification/resolution
4. Collection/tracking of testing results
5. Beta release candidate 2
6. Correct action plan from beta testing
7. Summary
 - a. Testing results
 - b. Recommendations

Pipeline Dependencies and Data Sources

	Hosting Capacity	Resilience	Electrification	Tariff Design
Weather	NSRDB	NOAA or CSV	NSRDB	NSRDB
Load model	AMI loadshapes	AMI load data	AMI loadshapes	AMI loadshapes
Network	CYME	CYME	CYME	CYME
Equipment	CYME	CYME	CYME	CYME
Rates				HIFLD, OpenEI
Vegetation		SALO		
Poles		Spidacalc or CSV		
Elevation		USGS		
Powerlines		CYME or CSV		

General Methodology for Testing and Validation

Four main testing and validation regimens:

1. Algorithmic validation
 - a. Analysis of results
 - b. Demonstrated on data sets
 - c. Jupyter notebook implementation of algorithm run once for documentation purposes
2. Unit testing
 - a. Unit tests of the algorithm implementation components
 - b. Implement in deployed code with special test flags
 - c. Run by developer prior to making pull request
3. Functional autotesting
 - a. Tests the end-to-end implementation
 - b. Implemented in repositories
 - c. Used for validation of each pull request
4. User validation
 - a. Validation using actual utility data and models
 - b. Run on site by/for utilities

Coordination with Stakeholders, Users, TAC, and Testers

Principal Utility Stakeholders:

- SCE: NDA done, deployment in progress
- PG&E: NDA done through HAL/GW, no activity to report
- SDG&E: No activity

Other Partners Utilities:

- National Grid: Done.
- NRECA: Done.

TAC:

- No testing activities as of 1/31/22

Testers:

- HAL: pending
- Others: no activity

CYME converter testing and validation completed

- 3 use cases involved:
 - IEEE standard feeders (IEEE-13 and IEEE-123)
 - SCE test feeder (one sanitized SCE 12kV feeder)
 - National Grid feeders (2009 feeders)
- Input files for converter
 - MDB files for network and equipment database, CSVs for conversion configuration and network modification.
- Output files from
 - GLM for network and configuration, CSVs for network and equipment database, PNG for feeder topology.
- Baseline
 - Power flow simulations
- Output comparison
 - Power flow simulations from other software (e.g., CYME, IEEE standard test reports).

Resilience use-case validation in progress at SCE

Three analytic processes involved

- Large-scale coarse analysis of pole condition
 - Input data: SPIDACalc or CSVs, weather data with high resolution
 - Baseline: Failure data for poles (SCE)
 - Output comparison: time and conditions of failure
- Pole analysis with network impacts
 - Input data: SPIDACalc or CSVs, weather data, load data, distribution network, pole / transformer ID reference to associated network mapping file.
 - Baseline: Outage data correlated to pole out of service
 - Output comparison: Time and impact of failure
- Vegetation clearance
 - Input data: Vegetation data from Salo, conductor characteristics CSV
 - Baseline: Vegetation Contact
 - Output comparison: Outage due to vegetation contact

Use-case validation delayed due to 2021 staff constraints

- Electrification - final validation by SLAC Summer 2022
- Tariff design - final validation by SLAC Summer 2022
- Hosting capacity - final validation by HAL (time TBD)

Error Identification and Resolution

- Issue tracking
 - Pipeline issues collected on GitHub pipeline repositories
 - Platform issues collected on GitHub OpenFIDO repositories
- Resolution triage and resolution
 - Pipeline resolution by SLAC team under HiPAS
 - Platform resolutions by SLAC team under OpenFIDO
- Dissemination of updates
 - Pipeline updates distributed through HiPAS updates (~monthly)
 - Platform updates distributed through OpenFIDO updates (as needed)

Testing Results Collection and Tracking

- **Algorithmic validation**
 - Jupyter notebook validation is done by SLAC team technical reviewers
 - Issues are documented in review comments on GitHub.
- **Unit testing**
 - Unit test failures are addressed by developers prior to pull request
 - Errors are not documented unless fix is temporary/postponed
- **Autotesting**
 - Pull requests result in GitHub validation action using autotests
 - Autotest results recorded on GitHub workflows for later download
 - Autotest failures block pull request to prevent erroneous code updates
- **User Validation**
 - All issues from users are recorded in GitHub issues
 - Addressed by SLAC staff
 - Disposition usually documentation change, immediate code fix, or postponed issue.

Beta Release Candidate 2 Preparation

Updates coming on OpenFIDO platform for Beta RC2:

- File upload to generate config.csv automatically from dialog
- Add pipelines using pulldown in dialog
- Previewing, downloading, and opening results files
- Upgrades to online app in AWS

Pipelines are being developed continuously by HiPAS and other projects

Beta Testing Correction Action Plan

- Issues triage by SLAC CS/IT and engineering staff
- Fixes to OpenFIDO platform documentation and coded by SLAC CS/IT staff
- Fixes to pipelines by SLAC engineering staff (see HiPAS project)

Testing Results (Use-cases)

	Algorithm	Unit tests	Autotests	User Validation
Hosting capacity	Done	In progress	Not started	Not started
Resilience	In progress	In progress	In progress	In progress
Electrification	Done	In progress	Not started	Not started
Tariff design	Done	In progress	Not started	Not started

Testing Results (Supporting pipelines)

	Algorithm	Unit tests	Autotests	User Validation
Weather	(NA)	Done	Done	Not started
Load model	Done	Done	Done	Not started
Network	(NA)	Done	Done	Done
Equipment	(NA)	Done	In progress	Done
Rates	In progress	Done	Done	Not started
Vegetation	(NA)	Done	Done	Done
Poles	Done	Done	Done	Not started
Elevation	(NA)	Done	Done	Done
Powerlines	Done	Done	Done	Done

Recommendations

None

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