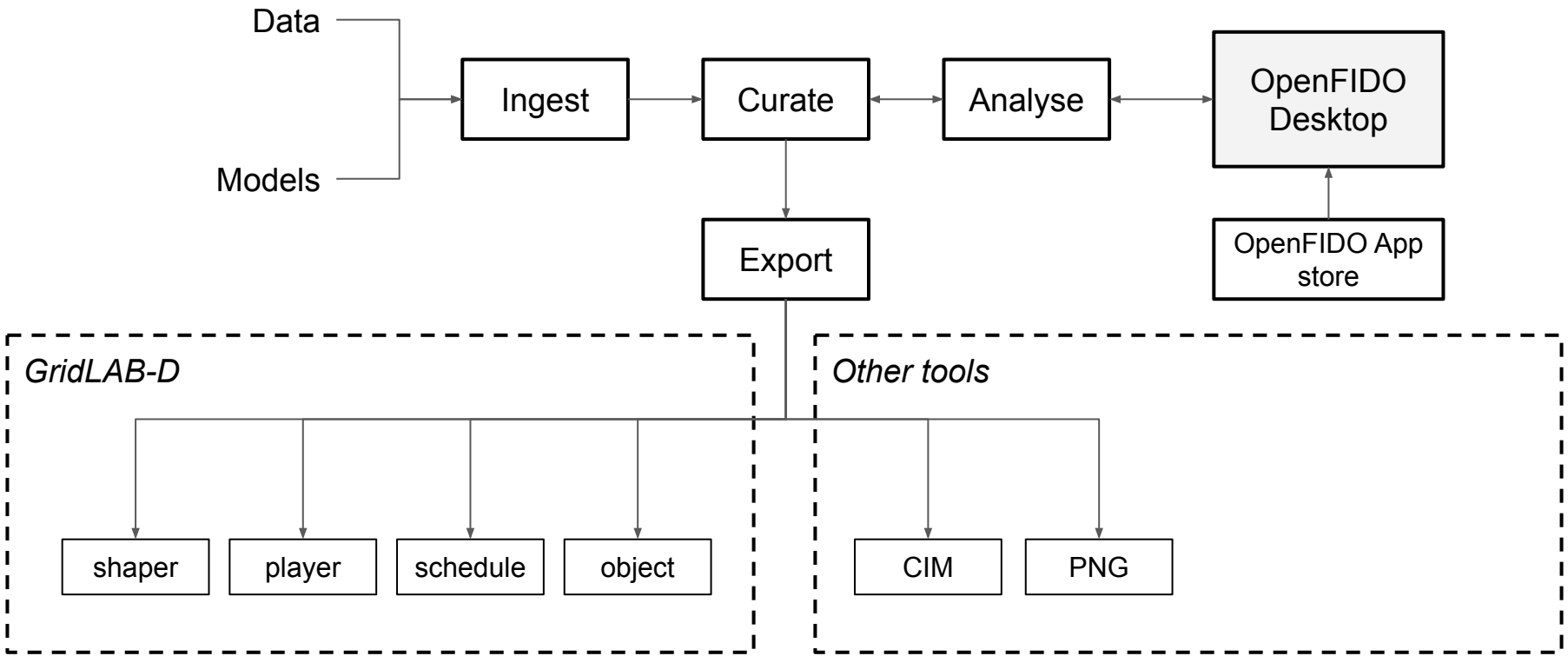
OpenFIDO

Data Exchange Implementation and Validation Plan

SLAC National Accelerator Laboratory
Last update: February 2019

OpenFIDO Workflow



Ingest

- **Data/model sources: local machine, local server, cloud servers (e.g., AWS)**
- **Data types: CSV, MySQL, Postgres, JSON, XML, XLS, etc.**
- **Model types: CIM, GLM, Cyme, and Synergi (others?)**
- **Access control: policies set during import, limited by user privileges**

Curate

- **Provides API to manage data access, quality, and provenance tracking**

Analyse

- **Provide API to process data**

Export - GridLAB-D data source

- **Generates data source definitions**
- **Players and shaper objects:**
  - Player settings (filename, interval, loops, etc)
  - Player on_init event handler to download original data to local cache
  - Shapers include statistical properties
- **Schedule definitions from data**
  - User controls schedule structure (blocks, normalization, boolean, etc.)
  - Calculates schedule values based on schedule structure (mean, mode, median, min, max, stdev, etc).
  -

Export - GridLAB-D models

- **Object properties (e.g., temperature sensitivity)**
- **Individual objects (e.g., single calibrated house model)**
- **Stochastic objects (e.g., calibrated house model using distributions)**
- **Object lists (e.g., collections of meters)**
- **Object networks (e.g., a distribution system model)**

Export - Other tools

- **CIM model export**
- **Plotting output support (e.g., PNG, PDF)**

Desktop

- **Collection of Python tk interface components**
- **“App store” model based on github repo contents**
- **Consolidated UI for direct use + UI components for GLOW**

OpenFIDO Wireframe 1

Data
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- ❑ MySQL

Model
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  - ❑ Player
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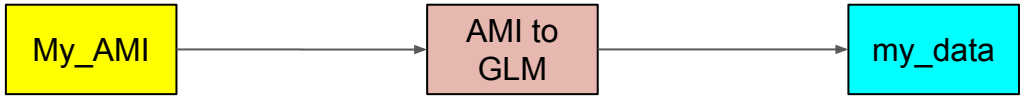
Process
- ❑ Data to GLM



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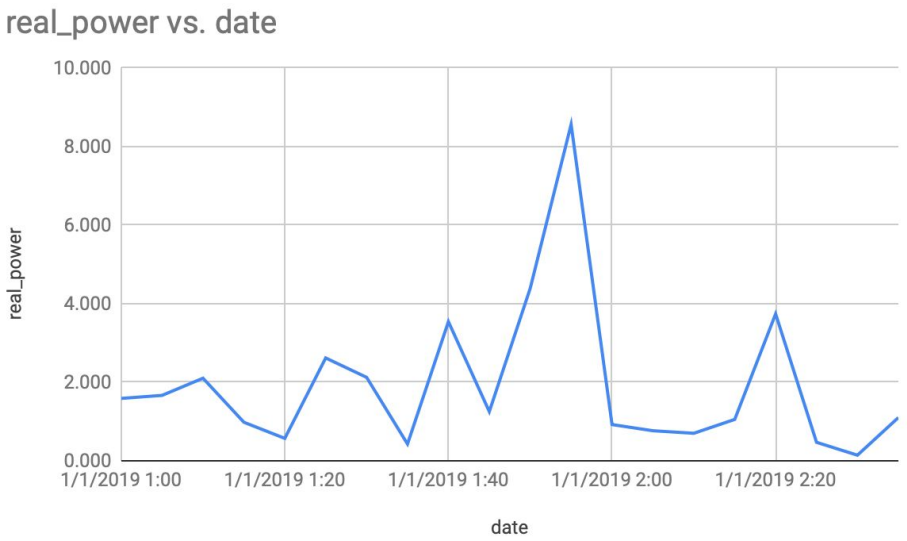
File: ami_data.csv

date	real_power	reactive_power
1/1/2019 1:00	1.587	0.175
1/1/2019 1:05	1.664	0.182
1/1/2019 1:10	2.101	0.241
1/1/2019 1:15	0.980	0.108
1/1/2019 1:20	0.570	0.066
1/1/2019 1:25	2.617	0.284
1/1/2019 1:30	2.123	0.247
1/1/2019 1:35	0.426	0.044
1/1/2019 1:40	3.541	0.378
1/1/2019 1:45	1.252	0.143
1/1/2019 1:50	4.389	0.524
1/1/2019 1:55	8.563	0.911
1/1/2019 2:00	0.921	0.105
1/1/2019 2:05	0.764	0.085
1/1/2019 2:10	0.699	0.075
1/1/2019 2:15	1.052	0.122
1/1/2019 2:20	3.739	0.403
1/1/2019 2:25	0.469	0.056
1/1/2019 2:30	0.141	0.016
1/1/2019 2:35	1.098	0.114

Time series	Scatter	Histogram
date	real_power	reactive_power



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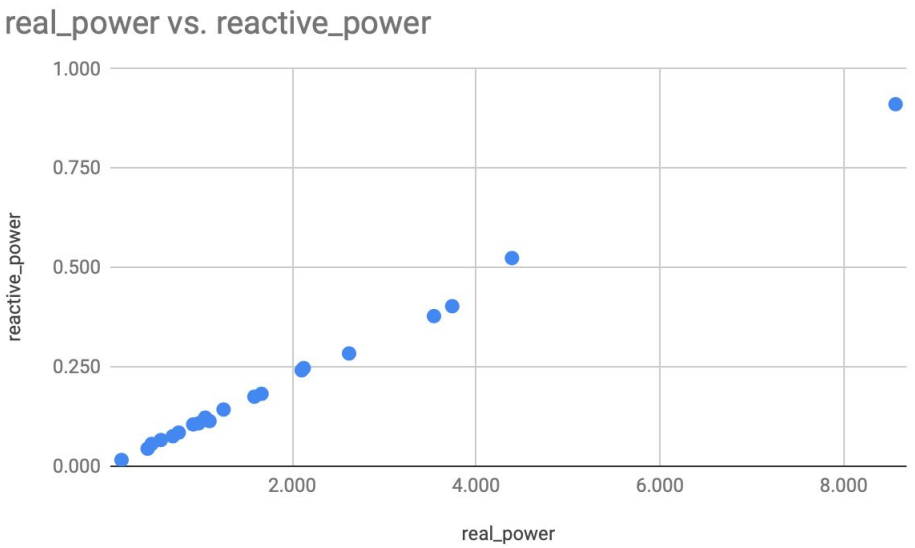

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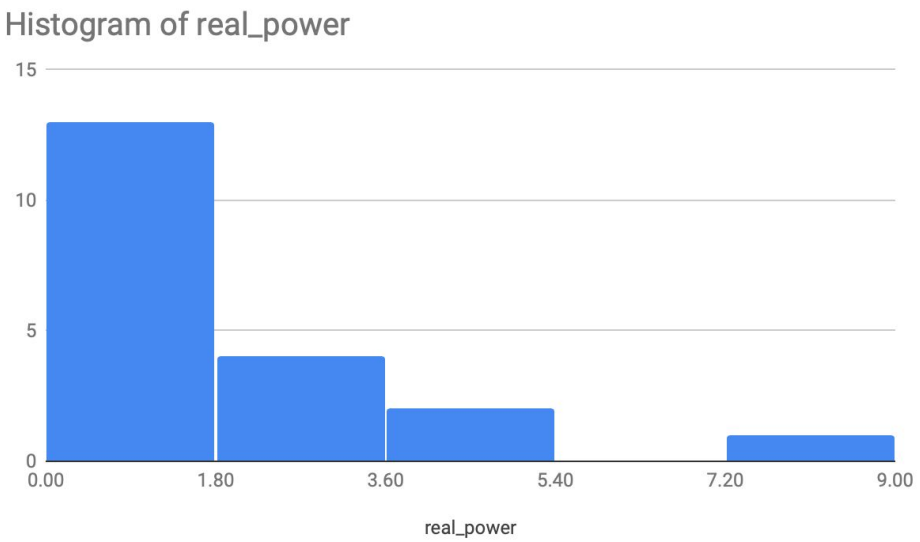

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Player: my_data	
File name	my_data.csv
Parent type	powerflow:load
Target property	constant_power_A

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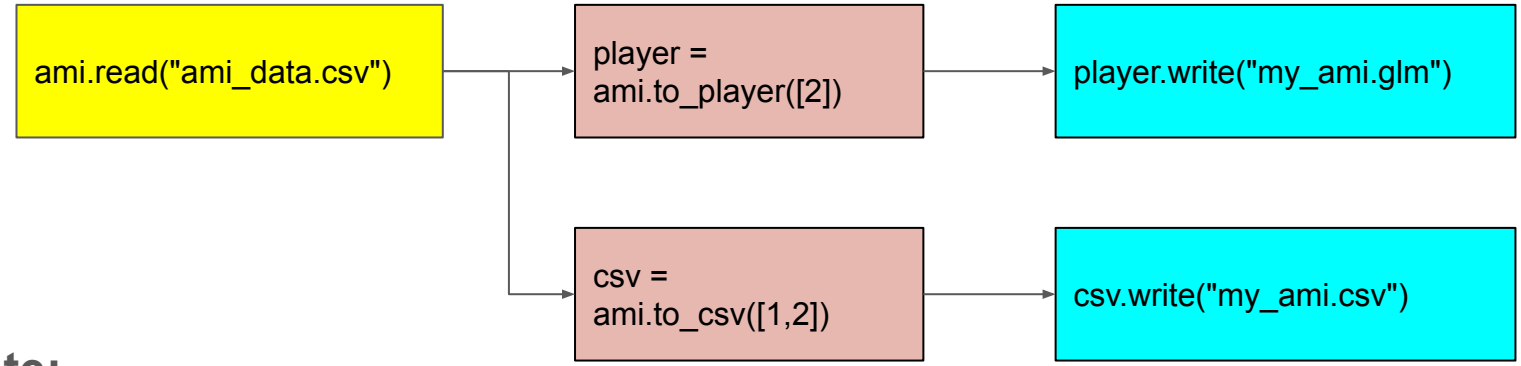
Process: AMI to GLM

	Input	**Output**
Class	Data	GLM
Type	CSV	player
Name	MY_AMI	my_data
Time	date	(auto)
Channel 1	real_power	constant_power_A
Channel 2	reactive_power	(none)

Workflow 1 pipeline instance



Note:

- **Parallelism is evident in instance structure**
- **User does not need to know how the instance functions**

OpenFIDO Wireframe 2

Data
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Process
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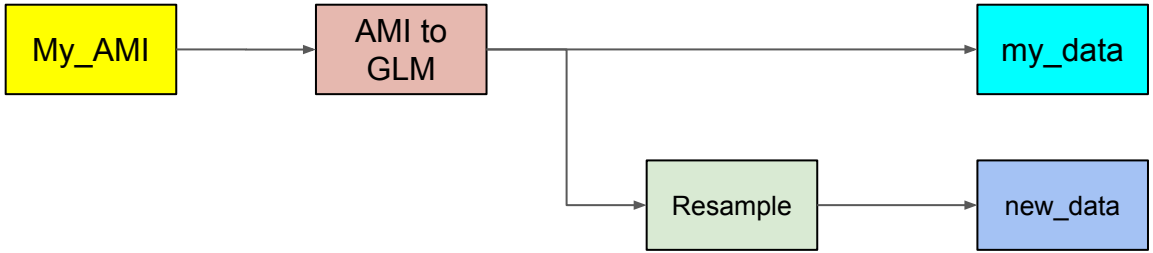
Filter
- ❑ Resample
- ❑ Decimate
- ❑ Difference
- ❑ Integrate



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Filter: Resample	
Input	Interval meter
Output	Schedule
Timestep	1 hour
Method	Mean Summer Weekday

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Schedule: Summer weekday average

	Minutes	Hours	Days	Months	Weekdays	Value
Interval 1	*	0	*	4-9	1-5	0.38
Interval 2	*	1	*	4-9	1-5	0.34
Interval 3	*	2	*	4-9	1-5	0.34
Interval 4	*	3	*	4-9	1-5	0.32
Interval 5	*	4	*	4-9	1-5	0.32
Interval 6	*	5	*	4-9	1-5	0.35
Interval 7	*	6	*	4-9	1-5	0.41
Interval 8	*	7	*	4-9	1-5	0.45
Interval 9	*	8	*	4-9	1-5	0.45
Interval 10	*	9	*	4-9	1-5	0.45
Interval 11	*	10	*	4-9	1-5	0.45
Interval 12	*	11	*	4-9	1-5	0.45
Interval 13	*	12	*	4-9	1-5	0.45
Interval 14	*	13	*	4-9	1-5	0.44
Interval 15	*	14	*	4-9	1-5	0.44
Interval 16	*	15	*	4-9	1-5	0.45
Interval 17	*	16	*	4-9	1-5	0.47
Interval 18	*	17	*	4-9	1-5	0.51
Interval 19	*	18	*	4-9	1-5	0.54
Interval 20	*	19	*	4-9	1-5	0.56