StraboExperimental / LAPS








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StraboExperimental / LAPS*

What is StraboExperimental?

*A **digital** repository for experimental rock deformation data. As part of the Strabo Ecosystem, it utilizes features from Strabo **in addition** to capabilities specifically for experimental data.*

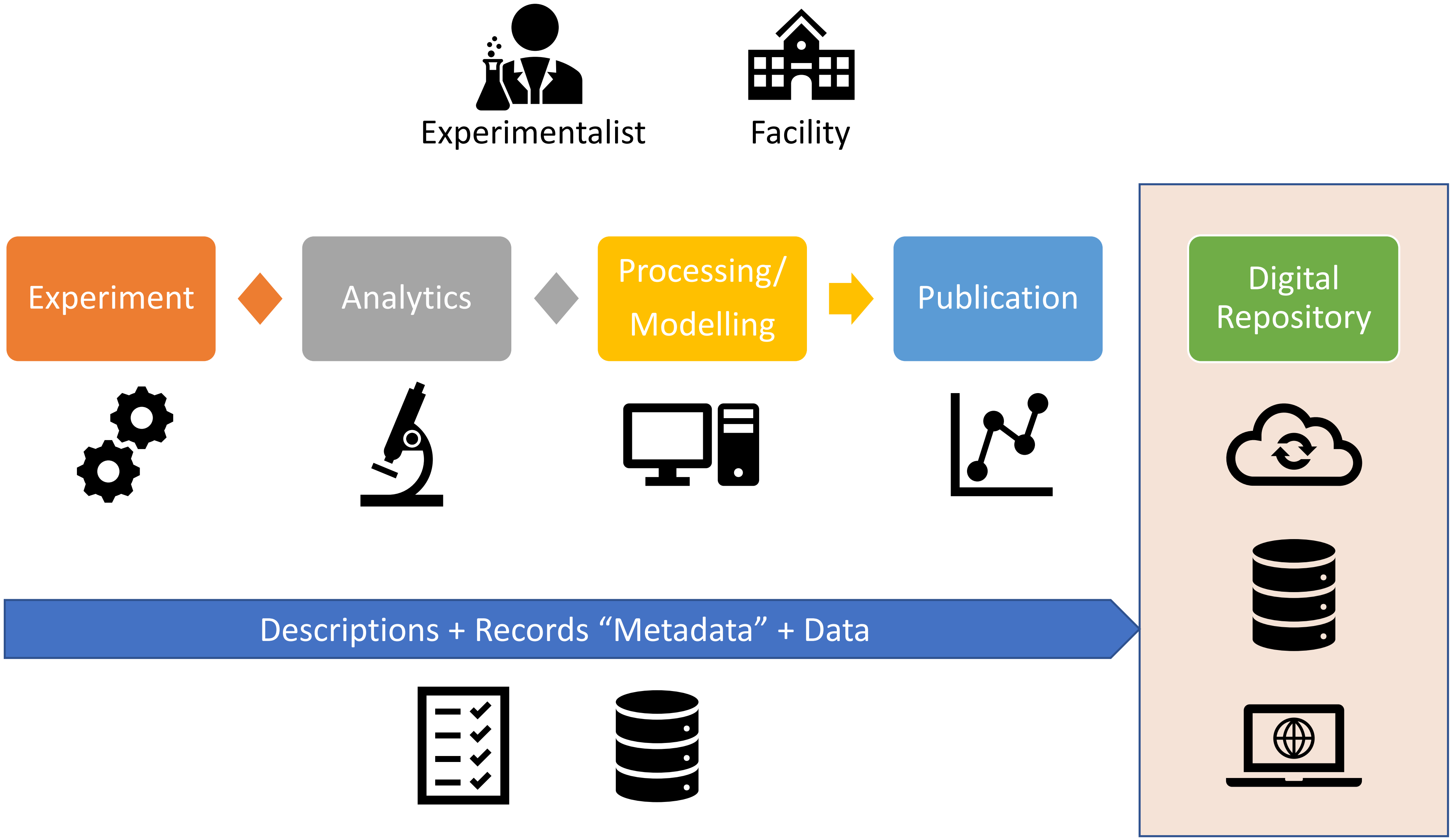
What is LAPS?

***Laboratory Acquisition & Protocol Standards**

*LAPS is a framework for preparing and storing experimental data **locally**. It comprises a set of instructions and workflow tools for gathering and organizing experimental results. Functionality includes import/export features and compatibility with **StraboExperimental.***

LAPS is funded by NSF – Award# (FAIN): 1948453

LAPS - Experimental Workflow



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Challenges

A. Technical Challenges

- Fragmented Data and Formats (Digital & Analog)
- Repository: Database Maintenance and Longevity
- Data Access (Software, API)
- Processing Tools

B. Societal Challenges - Community Standards

- No Metadata Standard
- Which data to include (processed-unprocessed)?
- Legacy Data, Pilot Data (published + unpublished)
- Data Quality Criteria
- Copyright, Citations, Privacy Issues
- Time Management

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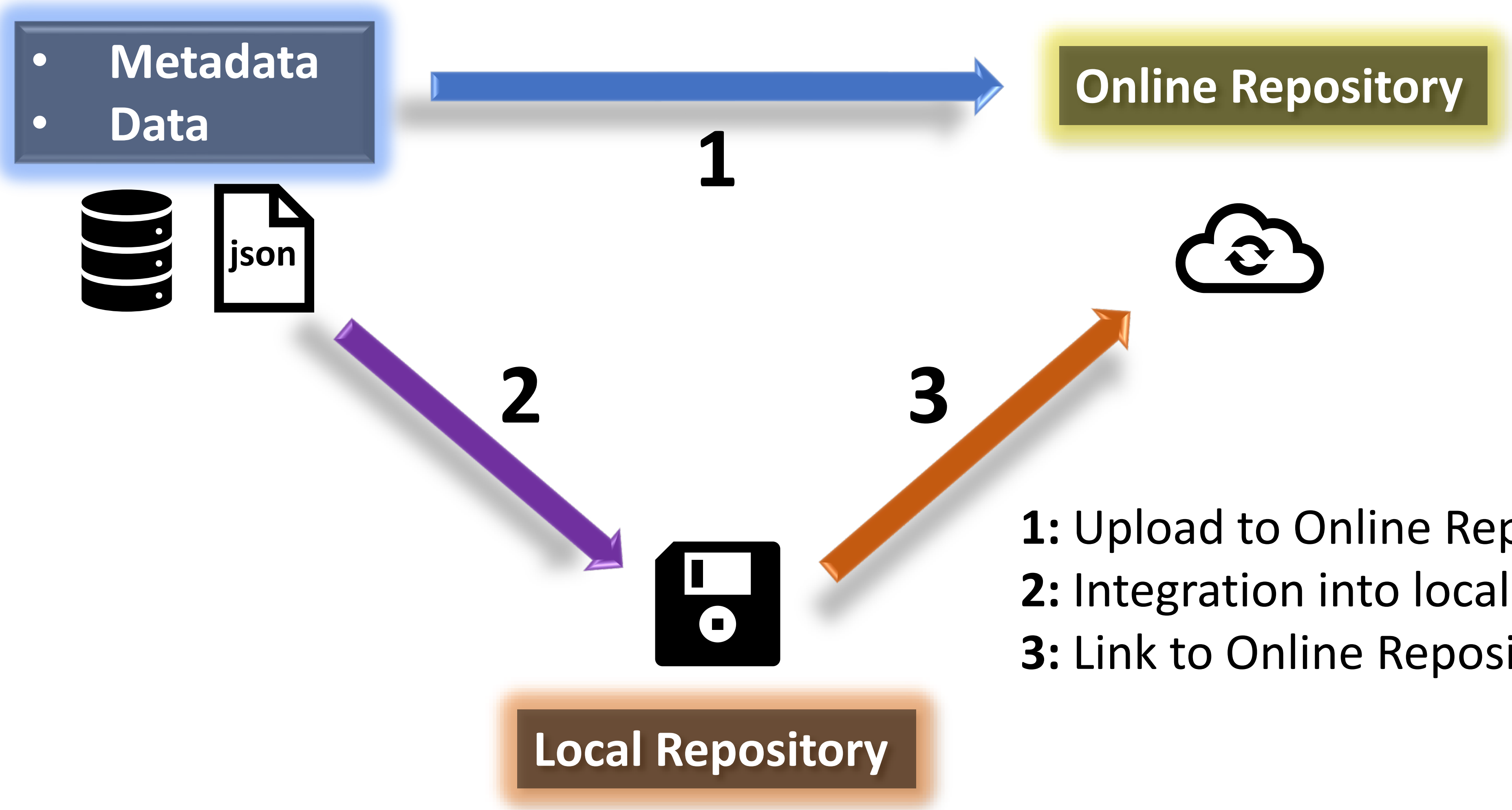
Data Management - Options



1: Upload to Online Repository
2: Integration into local Workflow
3: Link to Online Repository (API)

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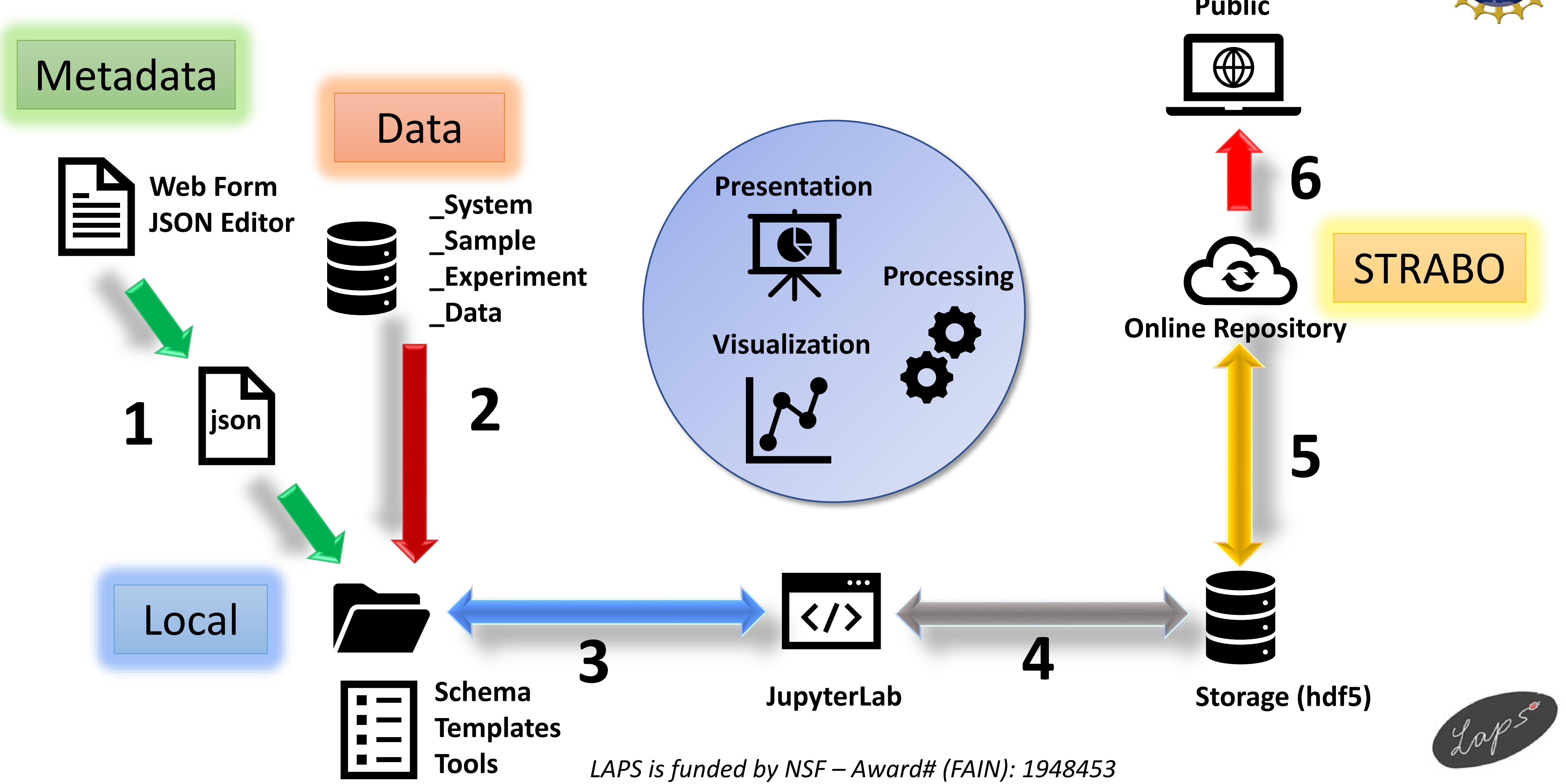
LAPS - Workflow Details



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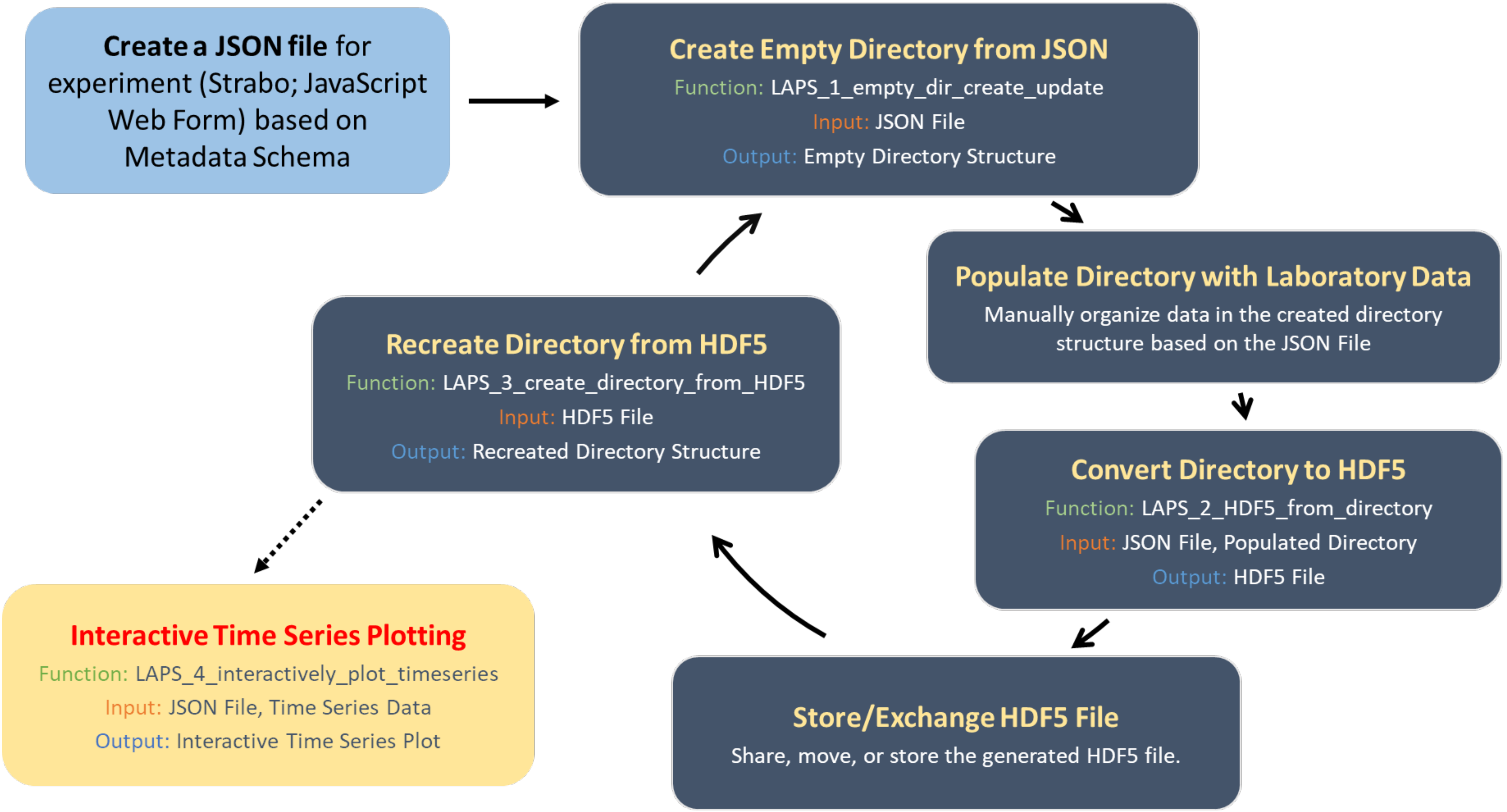
LAPS – Anaconda/JupyterLab/Python Tools



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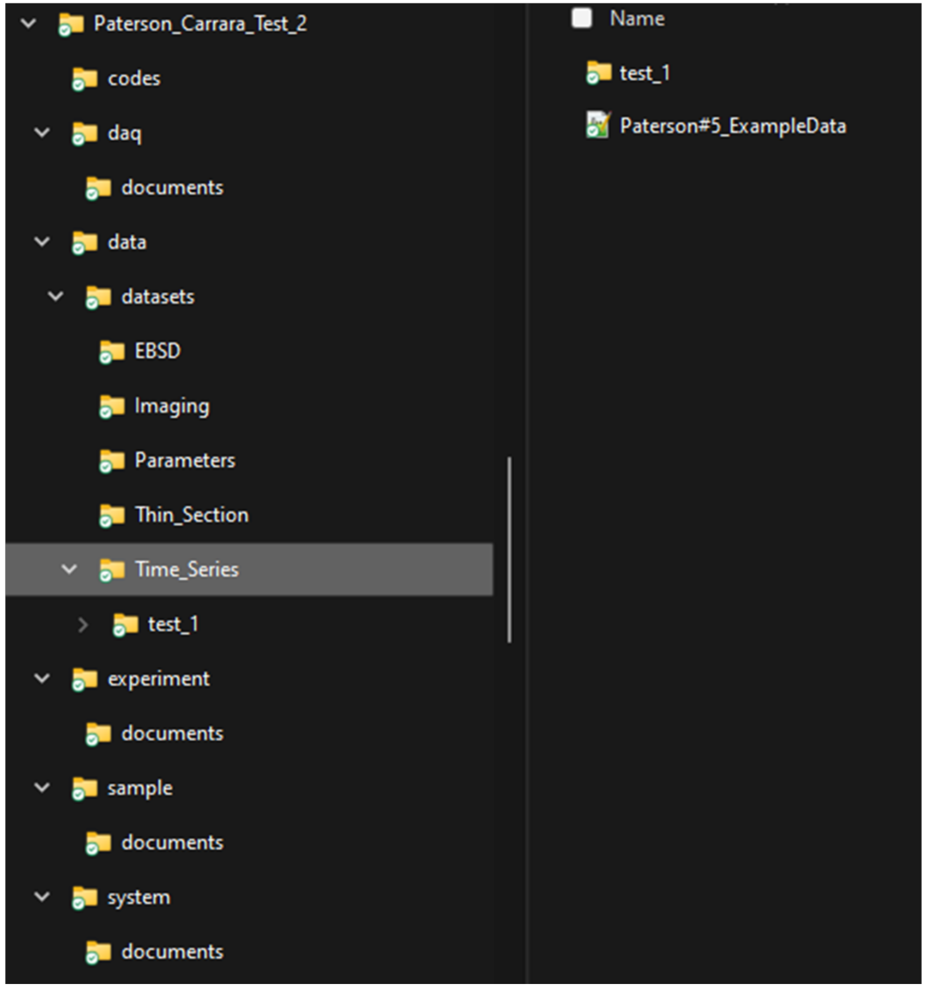
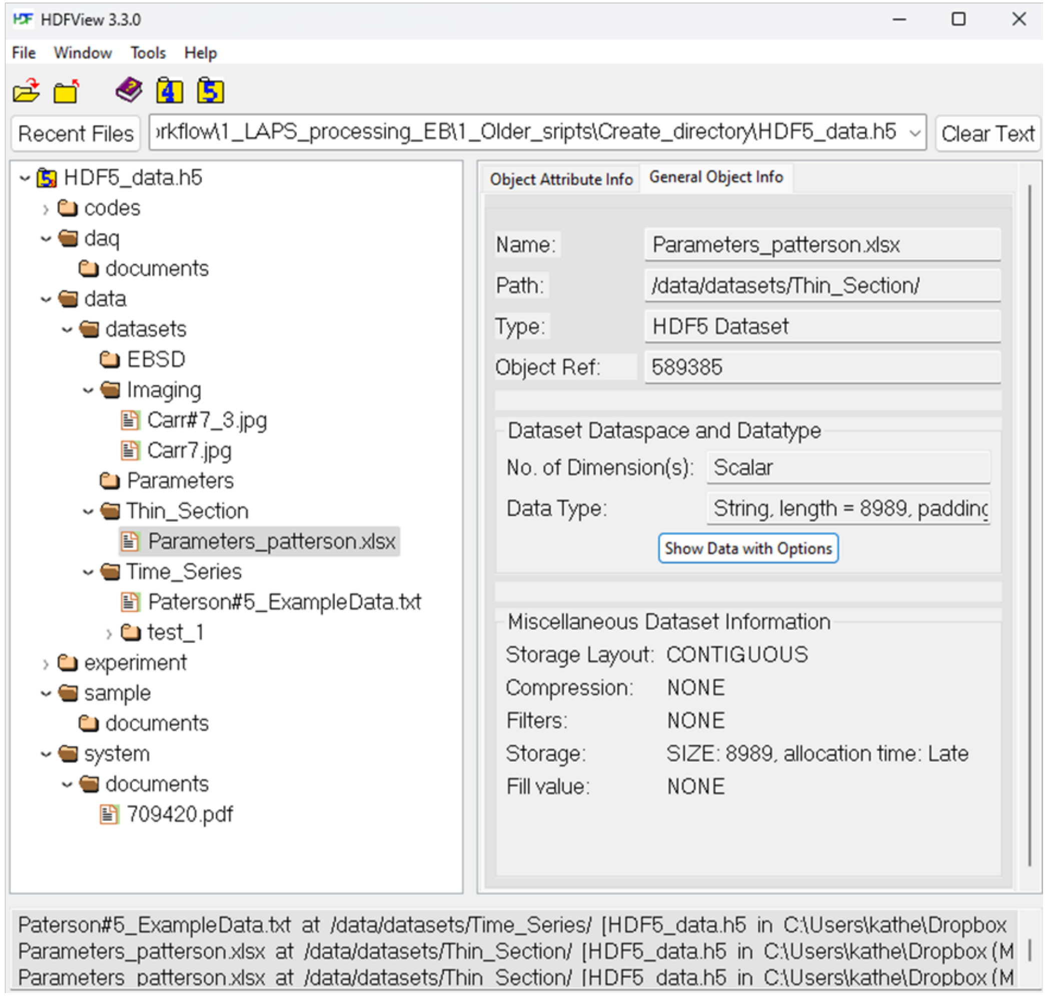
LAPS – Python Tools/hdf5

Folder structure to HDF5 file structure





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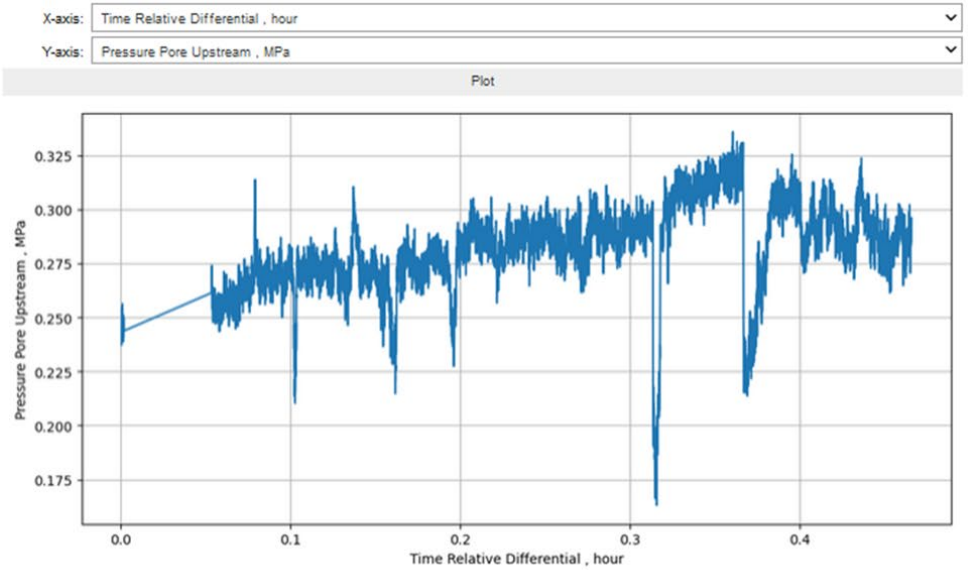
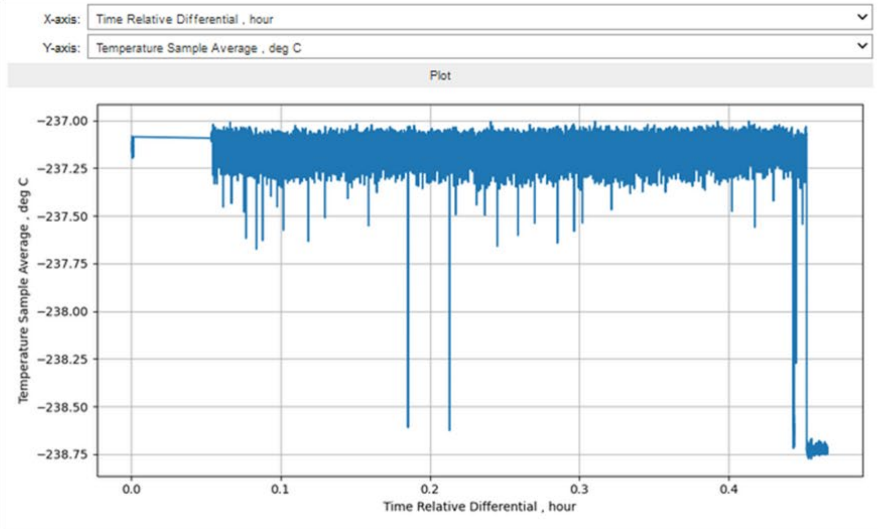
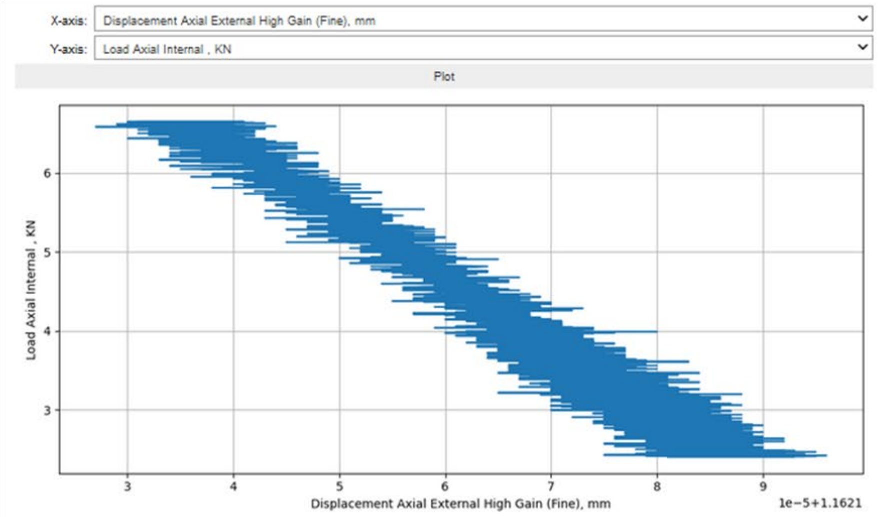
LAPS – Python Tools/Interactive Plots (Example)

Interactive time series data plotting

```
Project: Yield Point Study Carrara
Apparatus: Paterson Rig #5
No sample name
Datasets:
    Time_Series
       Time Relative Differential  ,  hour
       Time Relative Differential  ,  sec
       Load Axial Internal  ,  KN
       Displacement Axial External High Gain (Fine) ,  mm
       Displacement Axial External Low Gain (Coarse) ,  mm
       Displacement Volumetric Pore Volume  ,  mm
       Pressure Pore Upstream  ,  MPa
       Pressure Pore Downstream  ,  bar
       Load Axial External  ,  KN
       Pressure Confining Vessel  ,  MPa
       Temperature Sample Average  ,  deg C
    Parameters
      No headers
    Imaging
      No headers
    Thin_Section
      No headers
    EBSD
      No headers
```







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LAPS – Python and JupyterLab/Notebook Tools

In Development

- Strabo Metadata/Data upload and download via API
- Parsing tools for other Open Data Repositories
- Data Processing Tools (e.g., Calibrations)
- Acoustic Emissions Machine Learning Code
- Time Synchronization (between DAQ Systems)

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Comparison - Table

	STRABO	LAPS
Digital Repository	✓	✓ (single Test only)
Public Access	✓ (online)	✘ (offline)
Access Control	✓	✘
Metadata Standards	✓	✓
Structured Data	✓	✓ (json+hdf5)
Open Source	○	✓
Data Entry Forms	✓	✓
Database	✓	✘
External Data Reference	✓	✓
Workflow Integration	✘ (standalone)	✓
Strabo Integration	✓	○
API/Import Export	✓ / ✓	✘ / ✓
Readiness	2024	2024

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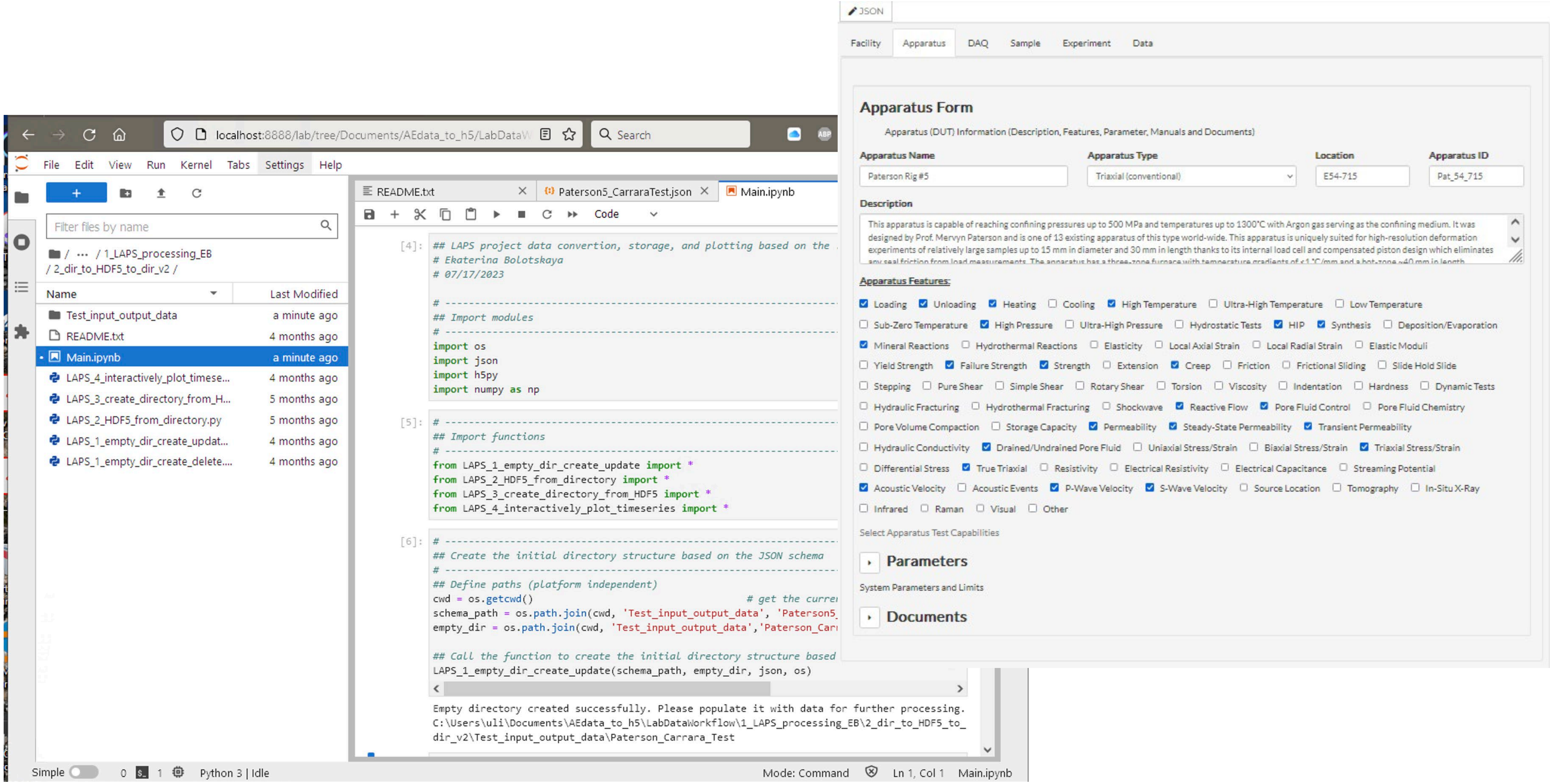
LAPS – Python/Html/Javascript Form Tool



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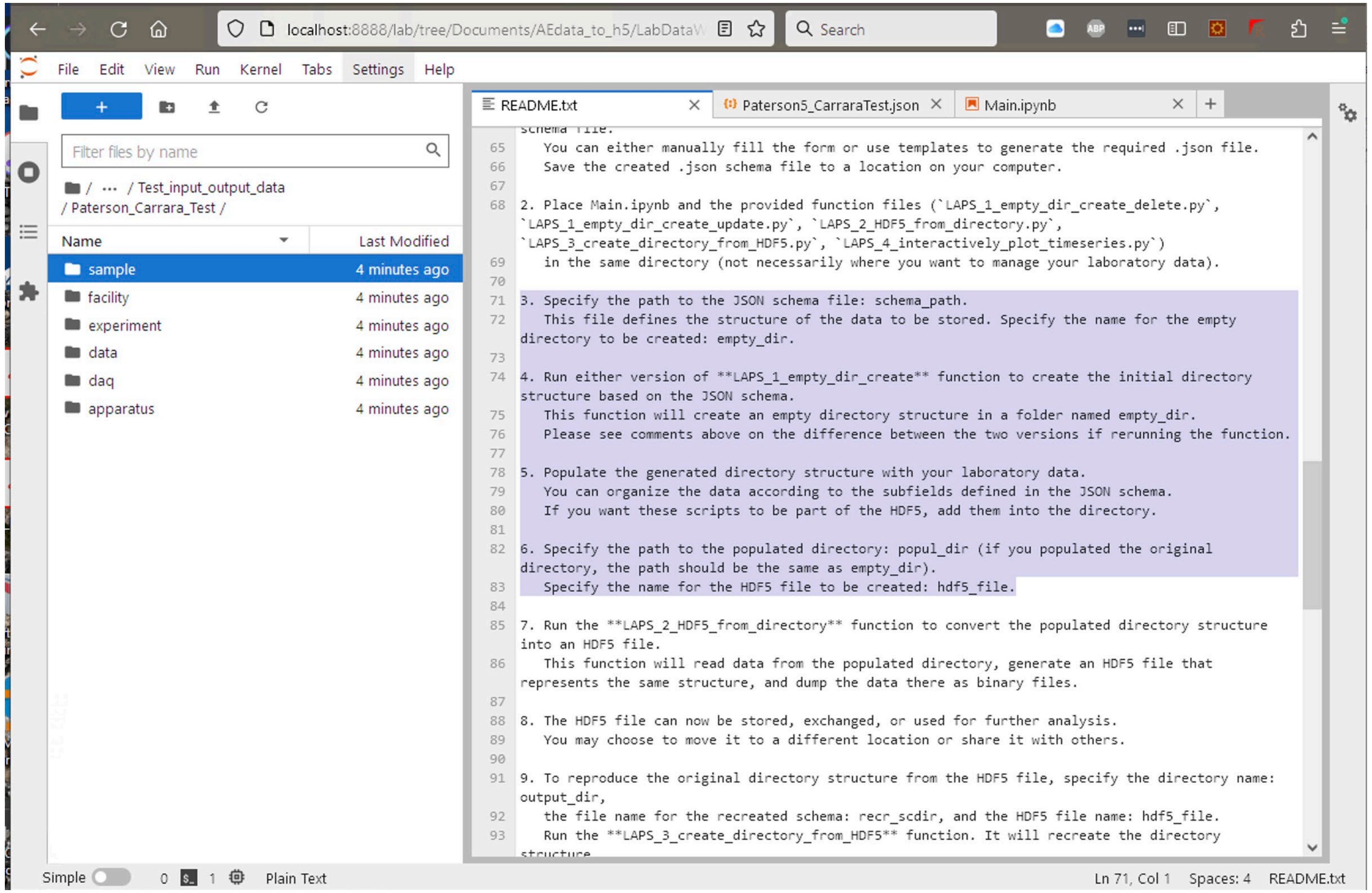
LAPS –Python Tools



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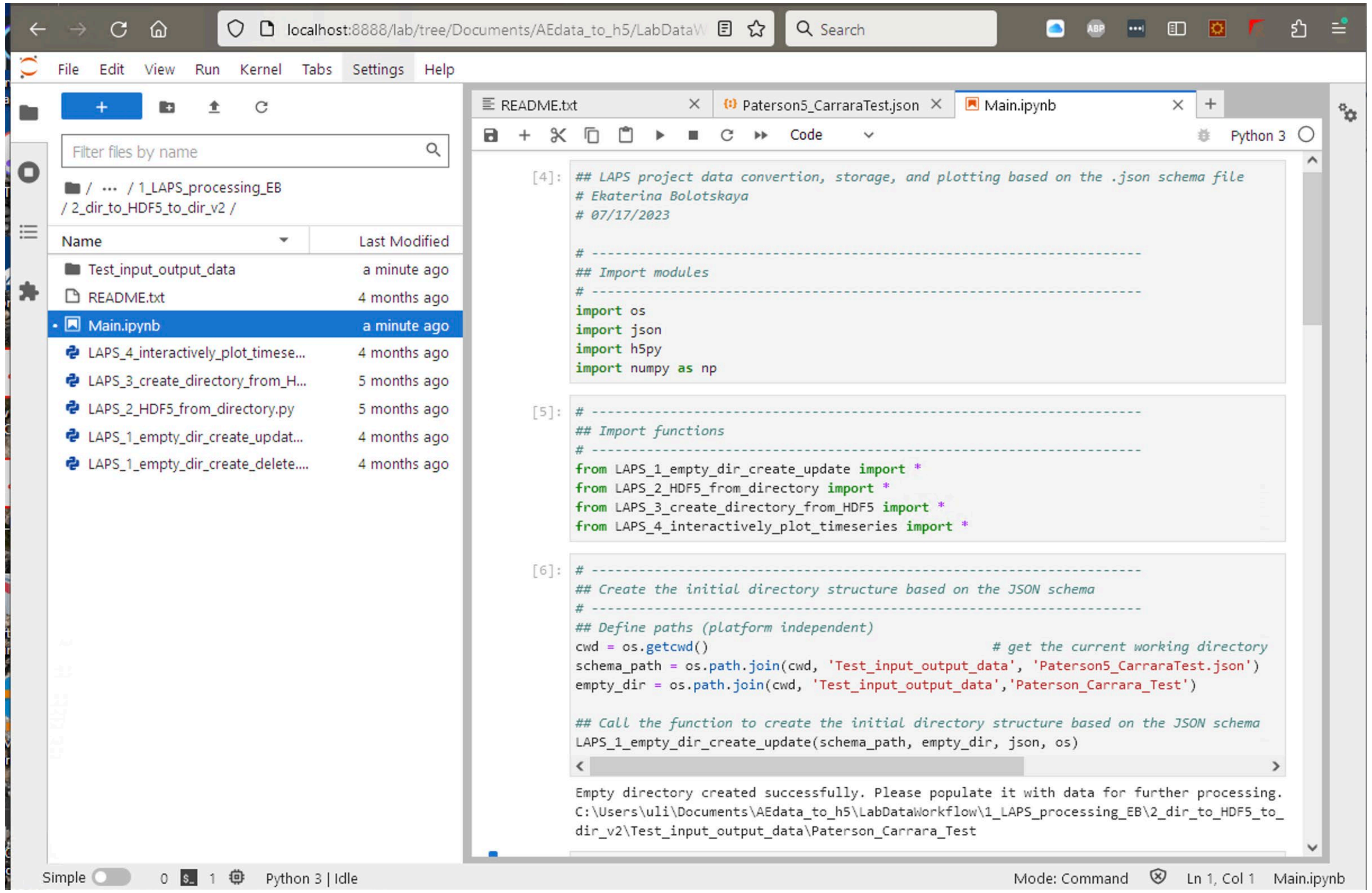
LAPS – Anaconda/JupyterLab/Python Tools



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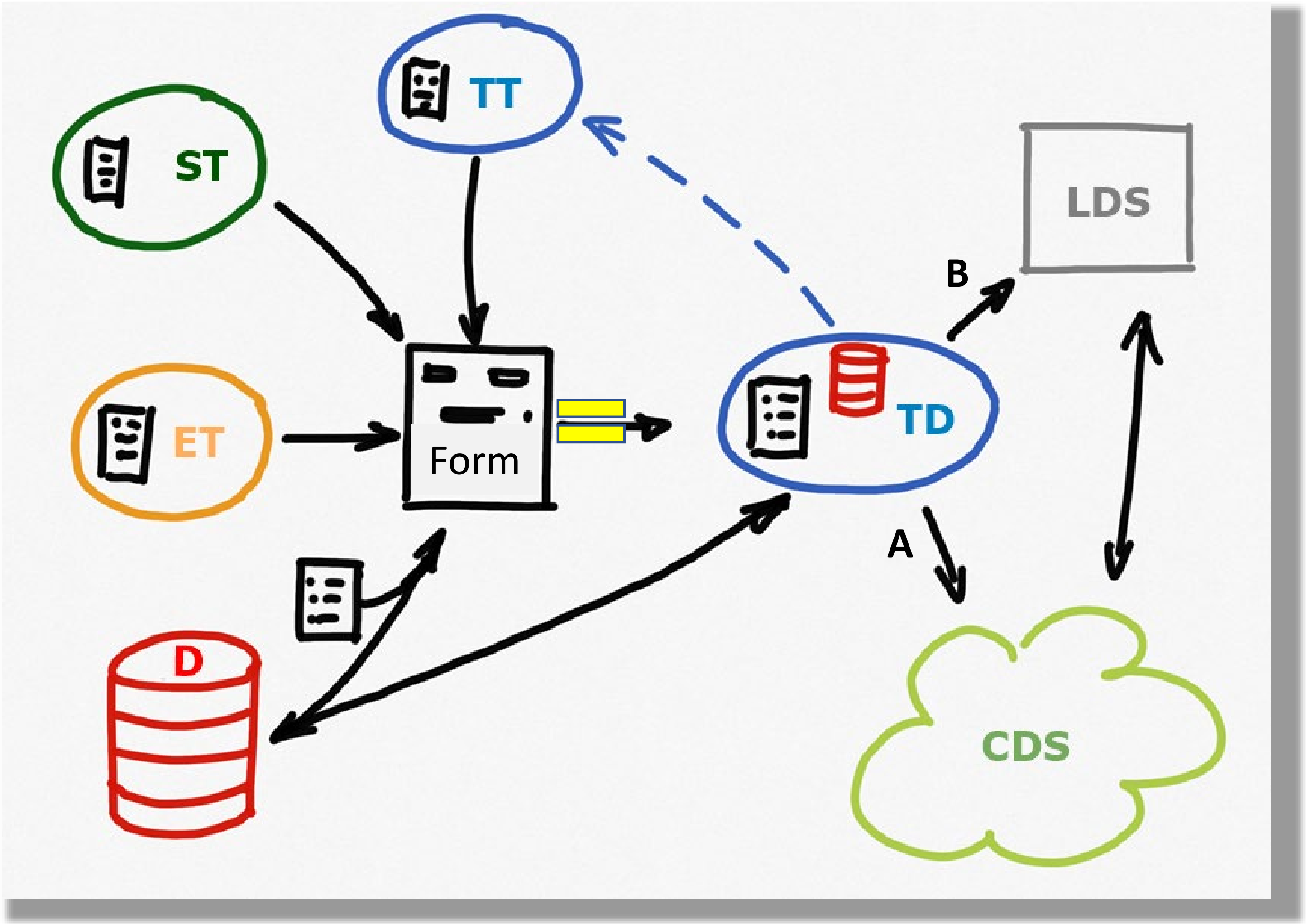
Laboratory Workflow

Combine Experimental Information + Data

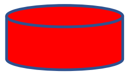


ST: System Template
ET: Experimental Template
Sample Template
D: Data

TD: Test Dataset
TT: Test Template

LDS: Local Data System
CDS: Cloud Data System

Meta Data

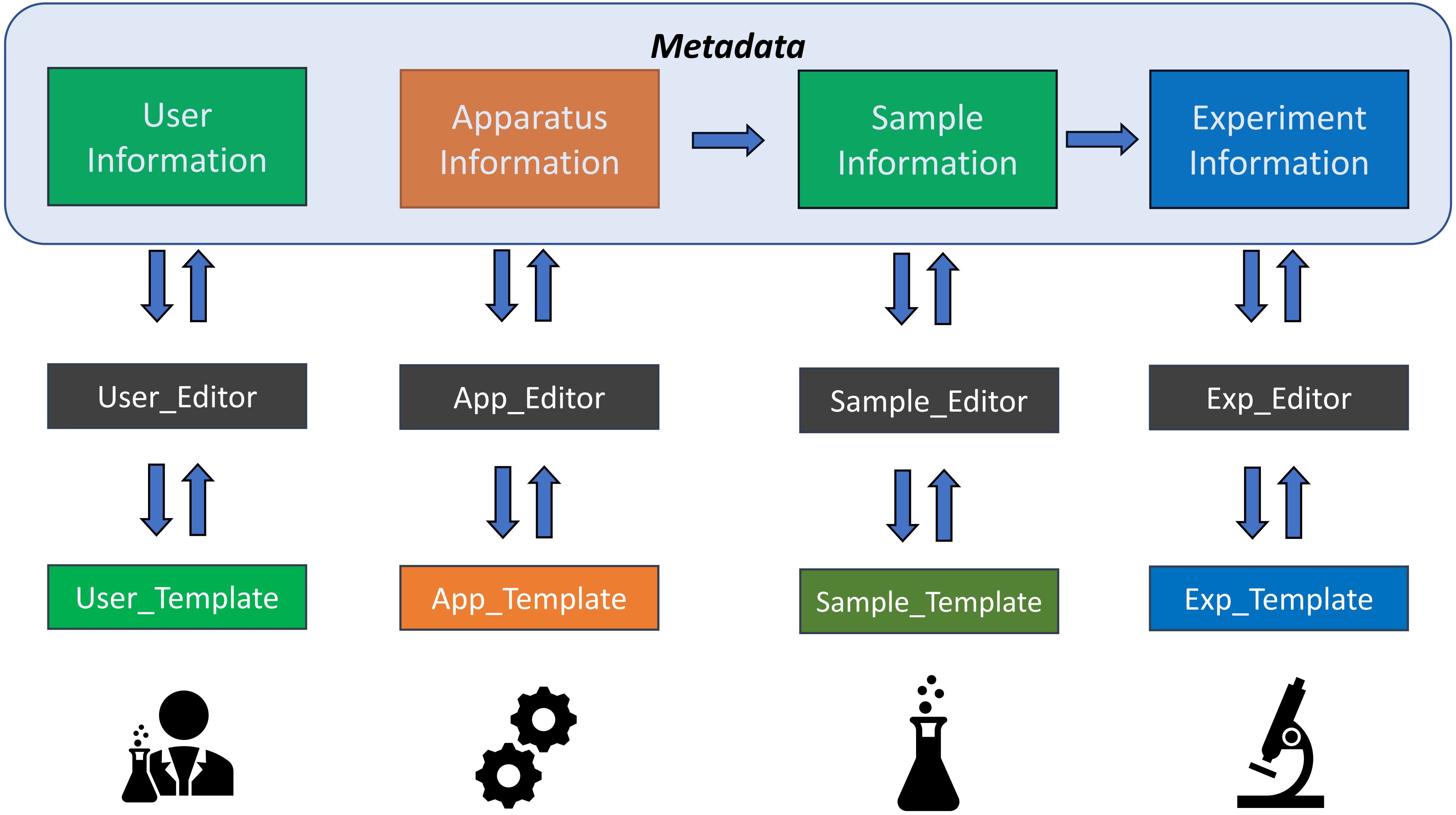


Data Set (e.g., Time Series)

Validation

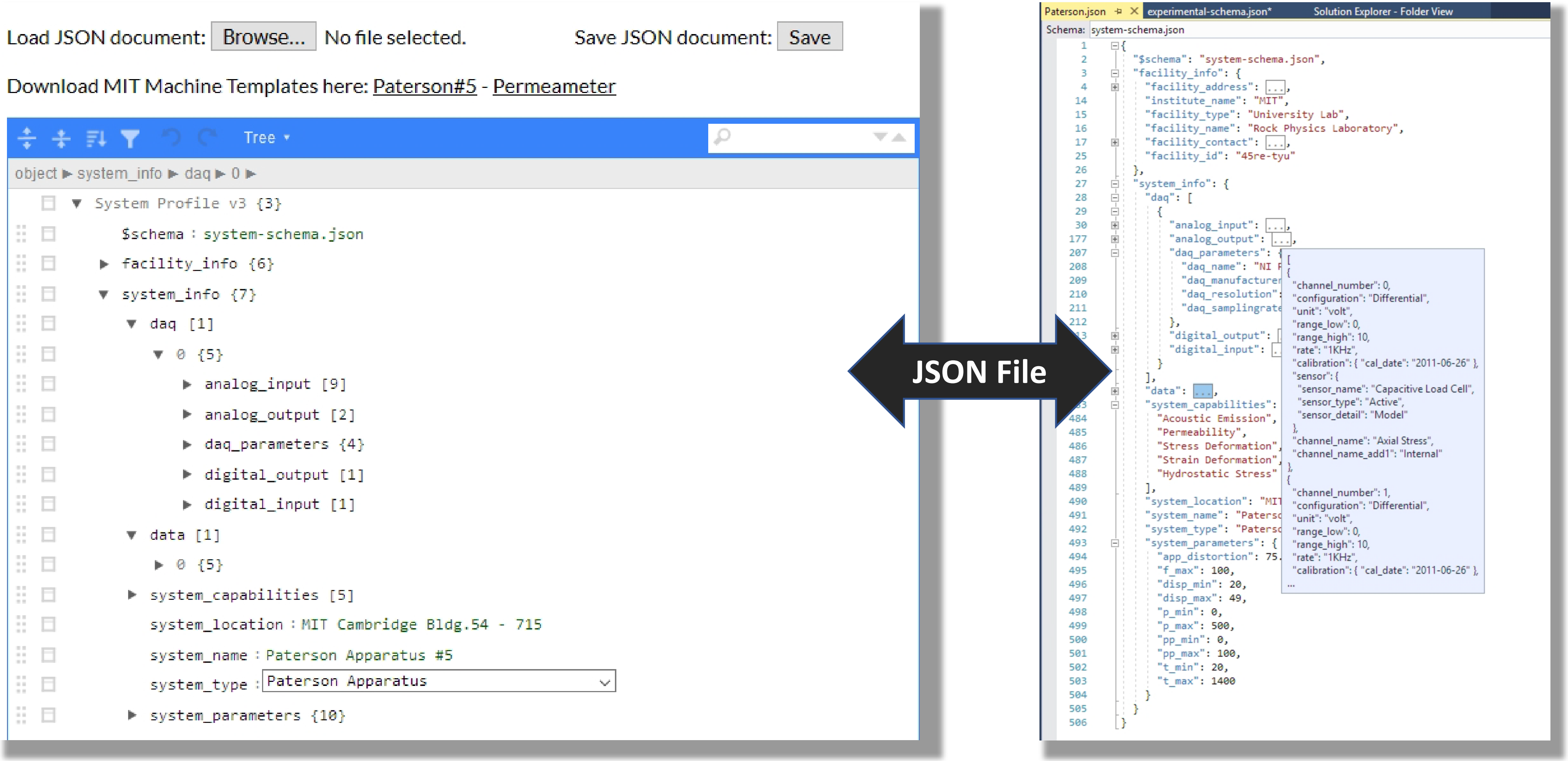
Templates

Templates simplify user input

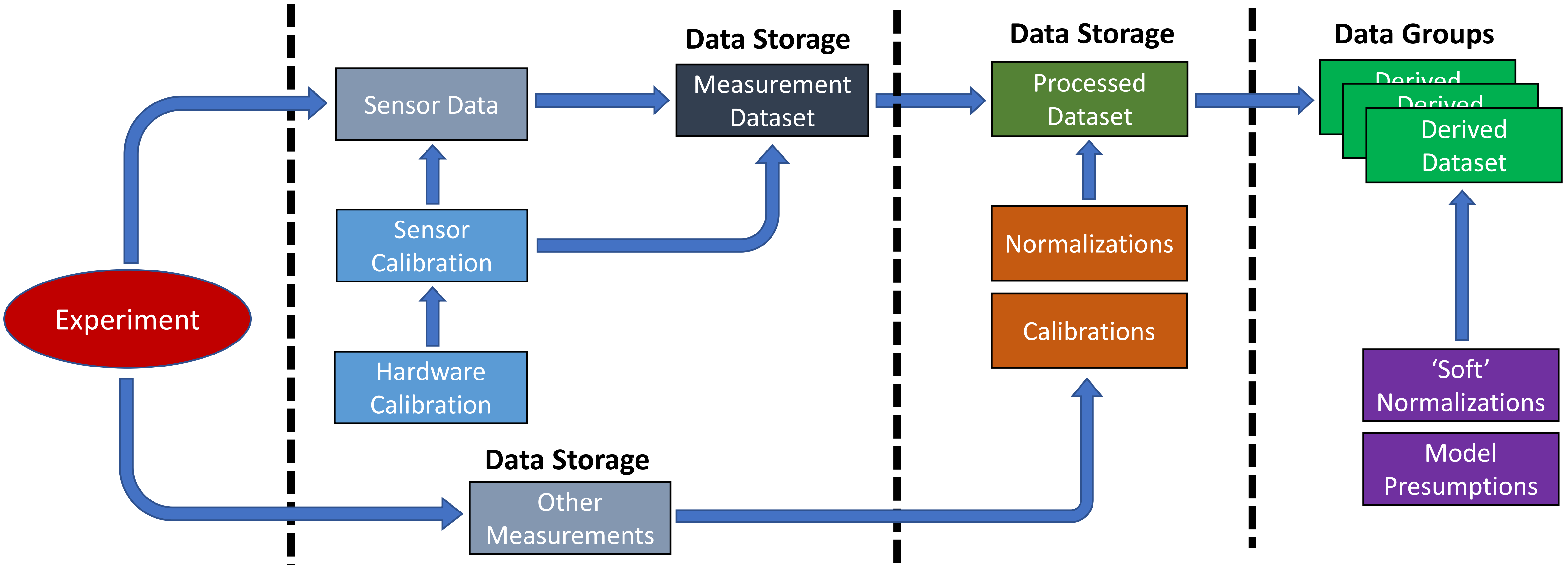


Alternative Editors

Many ways to modify and edit Experimental Data and Metadata



Laboratory Data Workflow - Scenario



<u>Non-Standard Data/Units:</u>
Calibrated or uncalibrated
Label/units/prefix depends on user and/or lab conventions and manufacturers specifications

<u>Standard Data Units:</u>
Normalized to standard SI label/units or community accepted label/units/prefix
Public Repository Data
Data Quality Label

Table Headers - Schema