RDM in practice – Electronic lab notebooks

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RPTU Summer School

July 20th, 2023

Content

- Intro to elabFTW as one example for electronic lab notebooks

- Pros & Cons of elabFTW

- Shaping your lab documentation towards FAIR

Check-in

elabFTW @ RPTU: https://elab.rptu.de/

⚠️ this is the RPTU elabFTW instance → Changes cannot be deleted.

Demo elabFTW: https://demo.elabftw.net/

⚠️ this is a public demo → All changes are public

🚀 **For today:** https://clerk.cs.uni-kl.de/

💡 this instance will be deleted after the summer school

Hands-on Circle

Feature
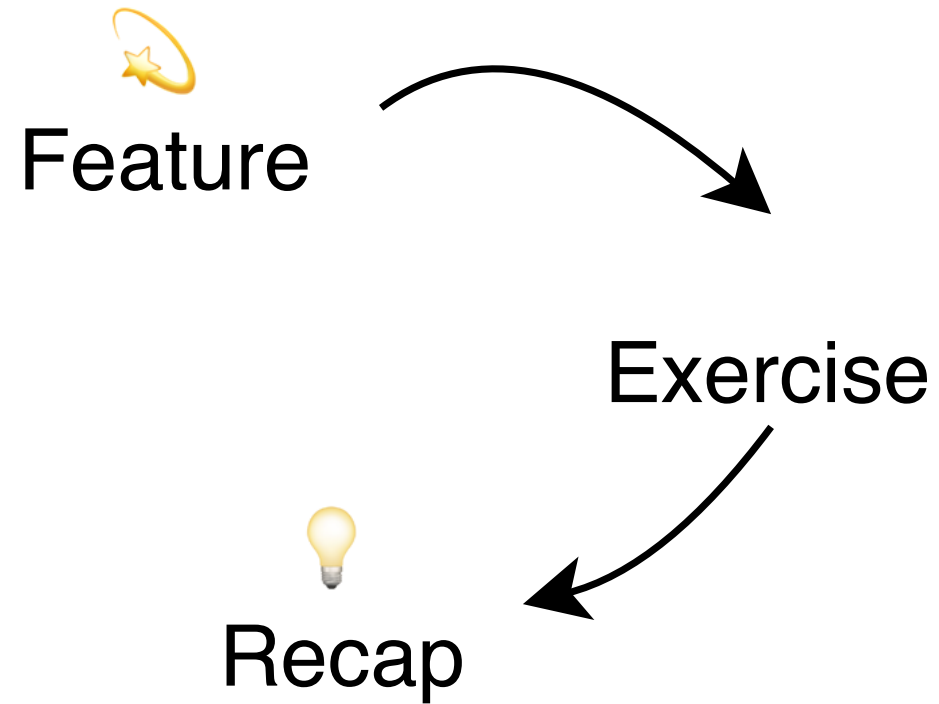
Exercise

Recap

Experiments panel

- Create an experiment

- View / edit mode
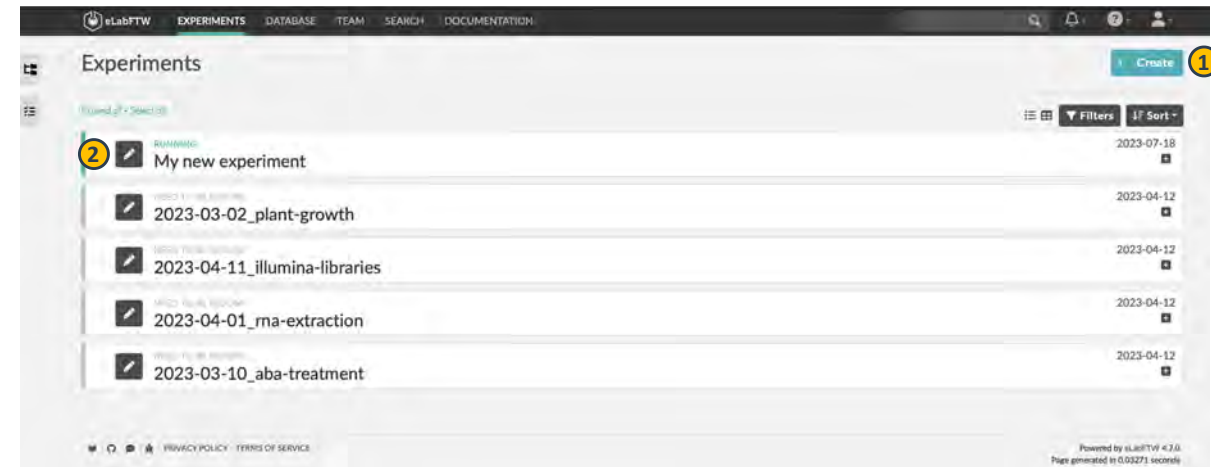
👩‍💻 Exercise

Create an experiment **Baking pancakes**

```
1. Ingredients
   – Flour
   – Eggs
   – Milk
2. Procedure
   – Mix ingredients
   – Fry in pan
   – Serve with maple syrup
3. ...
```

💡 Recap

- keine Metadaten

- Freitext

- JSON hilfreich

- Daten nicht verlinkt

Categorize

- Tags

- Database

- Link items

Tags

Database

Linking items

🧑‍💻 Exercise

Categorize your experiment items

- Use tags → "baking recipes"

- Create database entries → "ingredients"

- link items

💡 Recap

- 2x selbes Item

- Capitalization

- using items in an experiment

- different approaches of linking / resuing items (from database)

- which metadata to add where

- "different ways to do it"

- CV / ontologies

- PIDs

👩‍💻 Exercise

Start another experiment **Baking a chocolate cake**
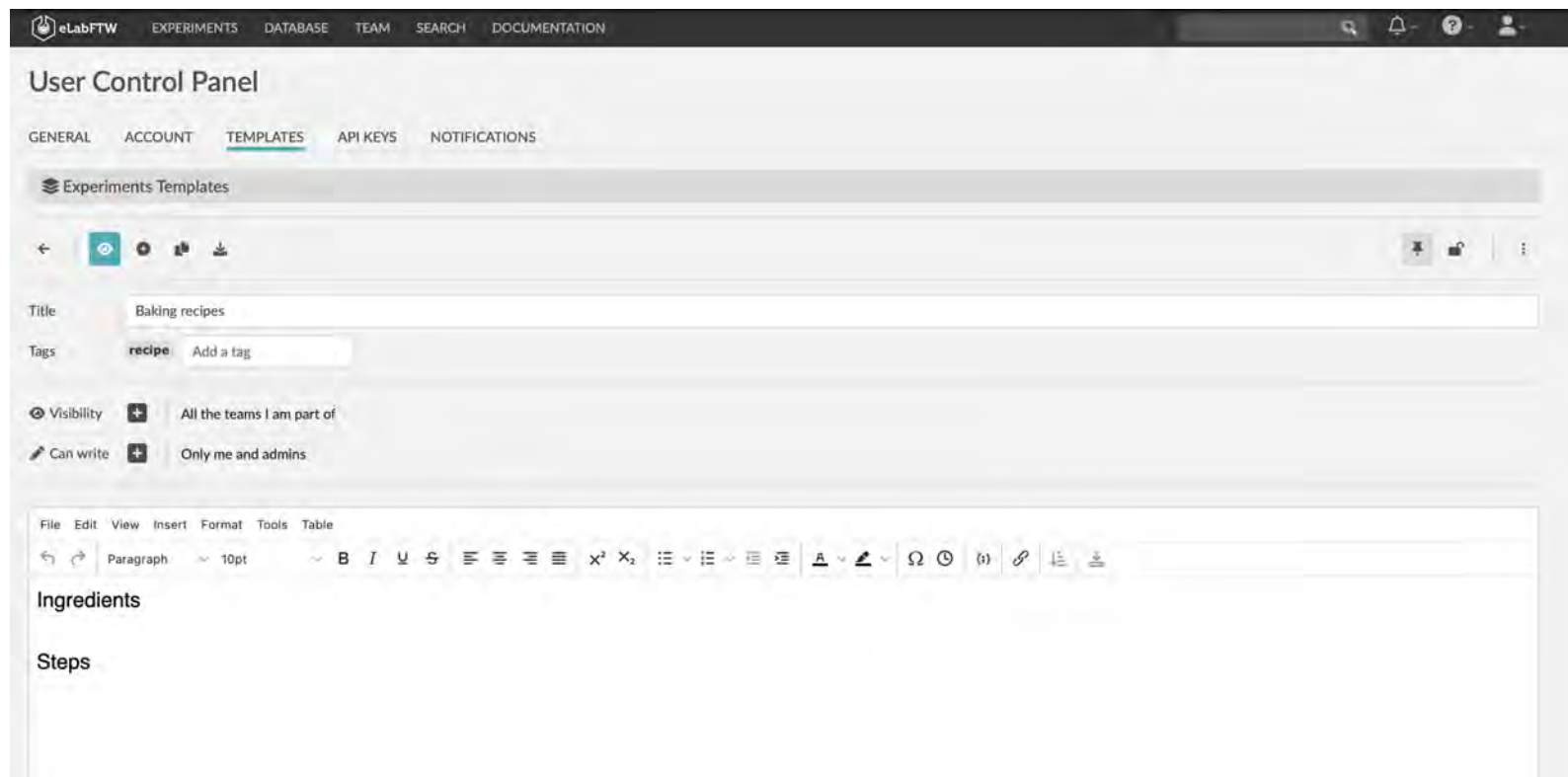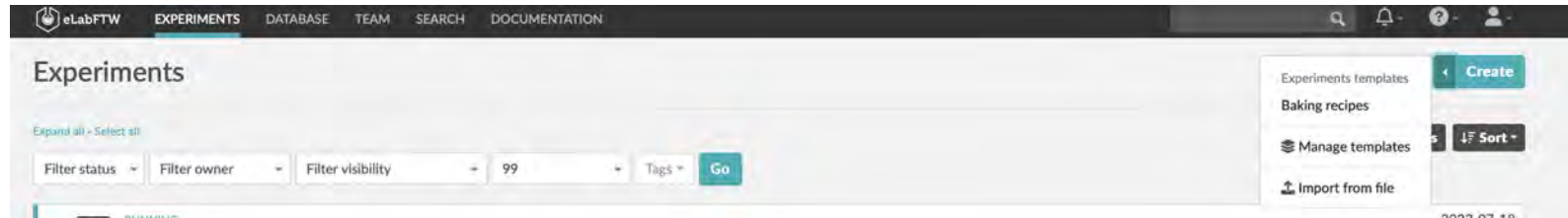
```
1. Grocery list
   – Flour, Sugar, Eggs, Butter, Milk, Chocolate
2. Steps
   1. Mix ingredients
      1. type of mixer
      2. speed
      3. type of beater
   2. Prepare cake pan
      1. type of cake pan
      2. butter cake pan
   3. Bake
      1. temperature
      2. top heat / circulating air
      3. Cooling phase
```

💡 **Recap**

-

Provide structure: Create templates

🧑‍💻 Exercise

Create an experiment template for **baking recipes**

💡 Recap

- user-friendly ++

- but a lot of free-text

- templating helps towards reusable structure
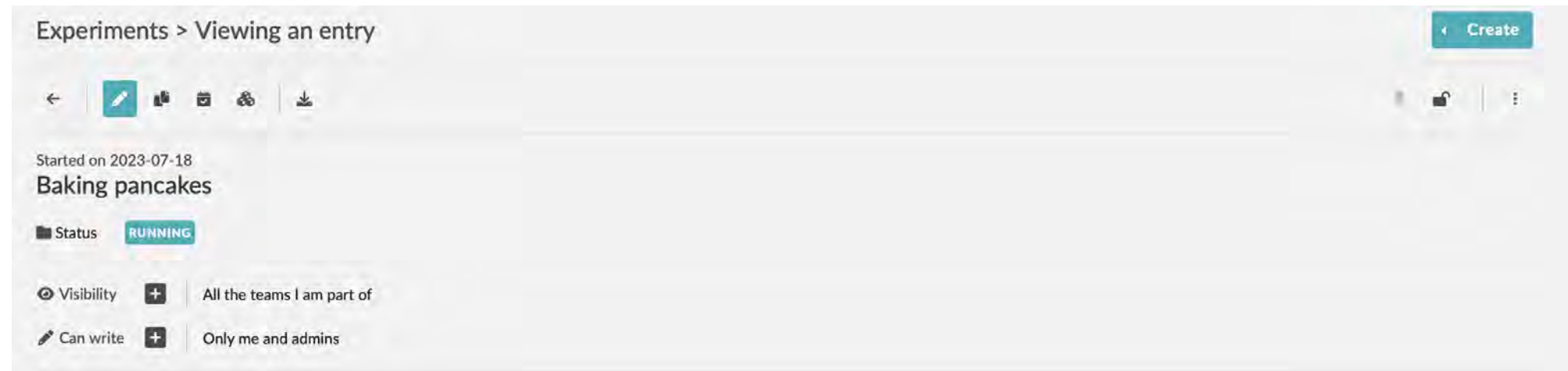
Add data to your experiment

💡 **Recap**

Share & Collaborate

Visibility and write access
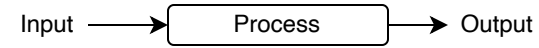
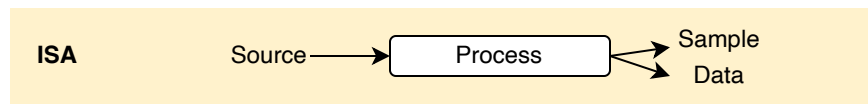# Version history

Restore revision

Export experiments

💡 **Recap**

Towards FAIR elabFTW

Cut protocols into pieces (processes)

Input ⟶ | Process | ⟶ Output

Define inputs and outputs
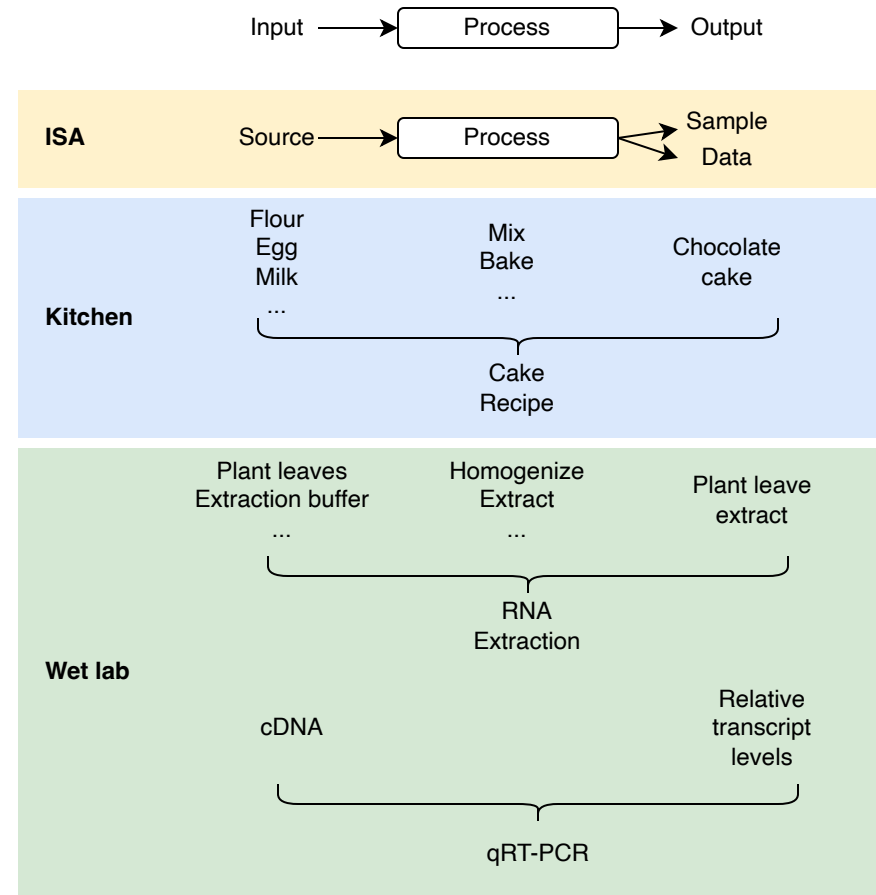

Input → Process → Output

ISA   Source → Process → Sample / Data
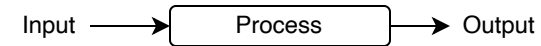
Cut protocols into pieces
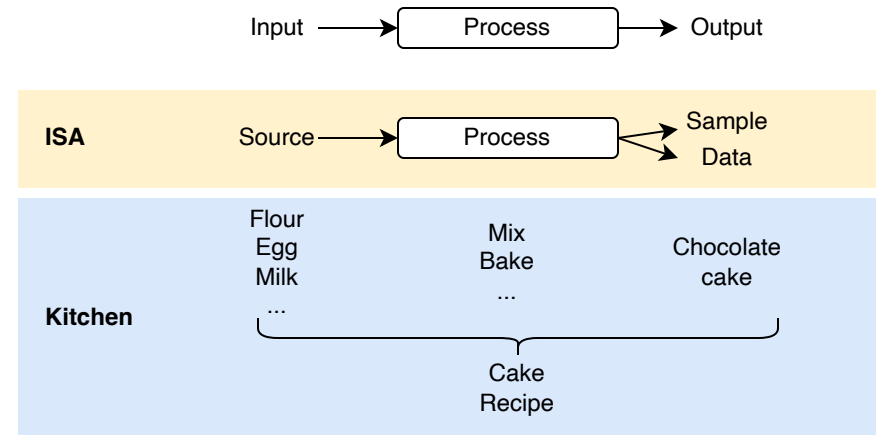
Cut protocols into pieces

Bridging elabFTW and ARC

Example Scenario

1. You use **ARCs** to

- organize and store your (raw) data locally

- share and communicate data with collaboration partners

- annotate and prepare your data for publication

2. You use **elabFTW** to

- document your daily lab work "on the fly"

- organize lab routines with colleagues

Goals

1. Benefit from "both worlds" (ARC and elabFTW)

- iteratively work on protocols

- be able to associate metadata to the raw data

2. Align elabFTW structure and ARCs
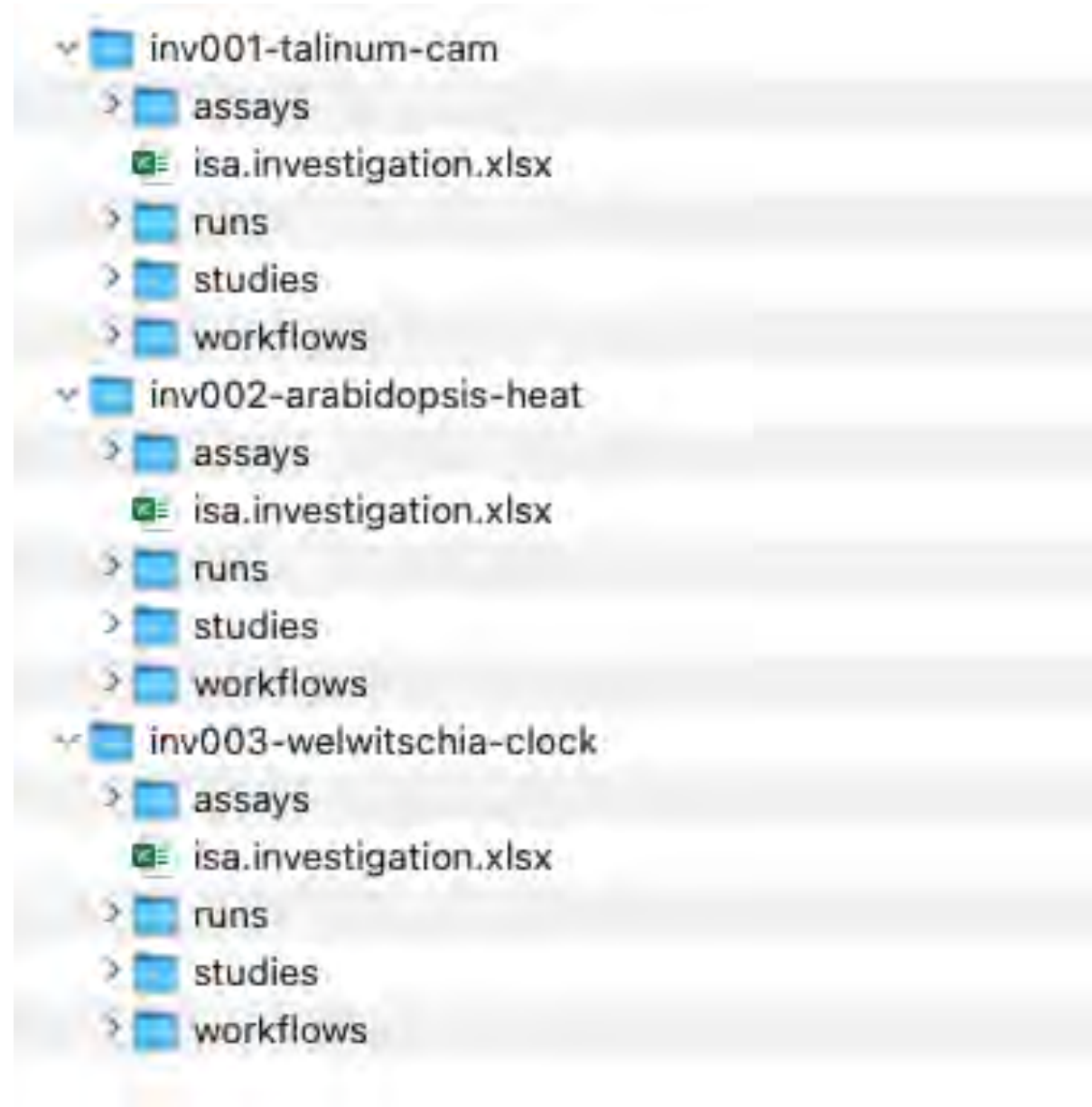
Schematize: JSON templates

Catalog your lab

1. Which items want to be shared and cataloged?
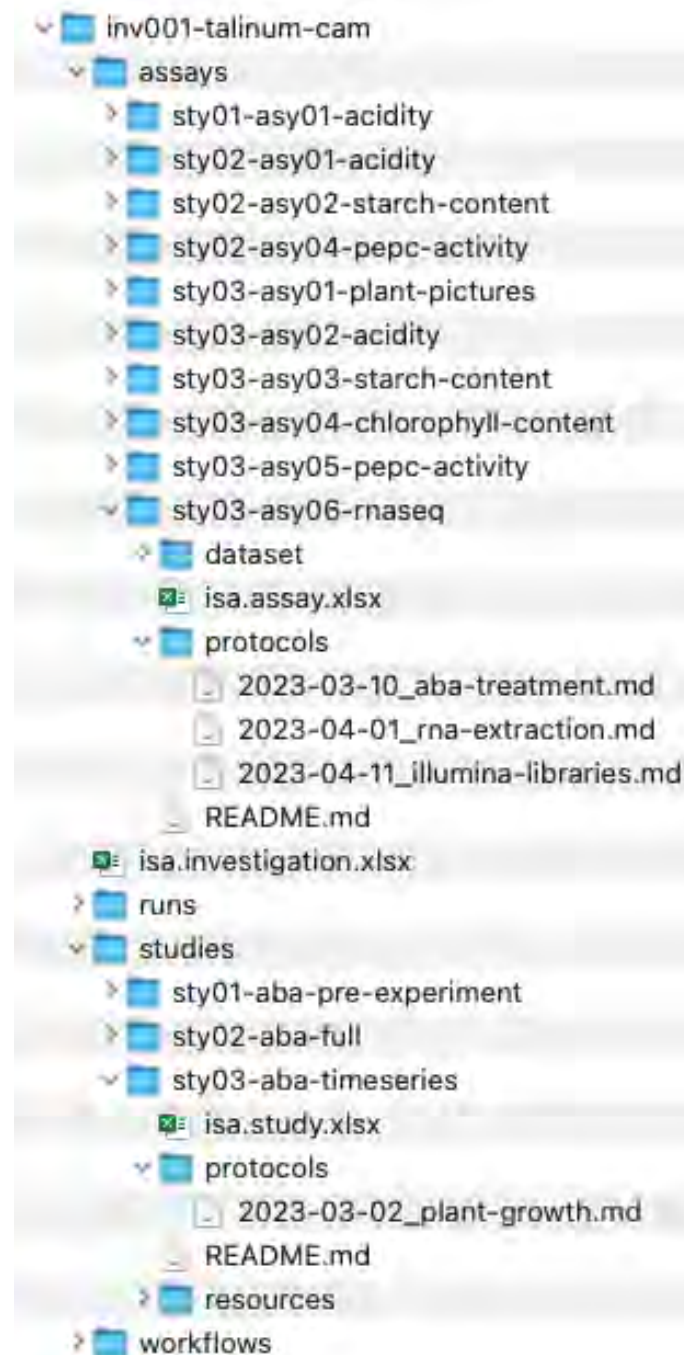
2. catalog: Name / ID items

3. Create item database
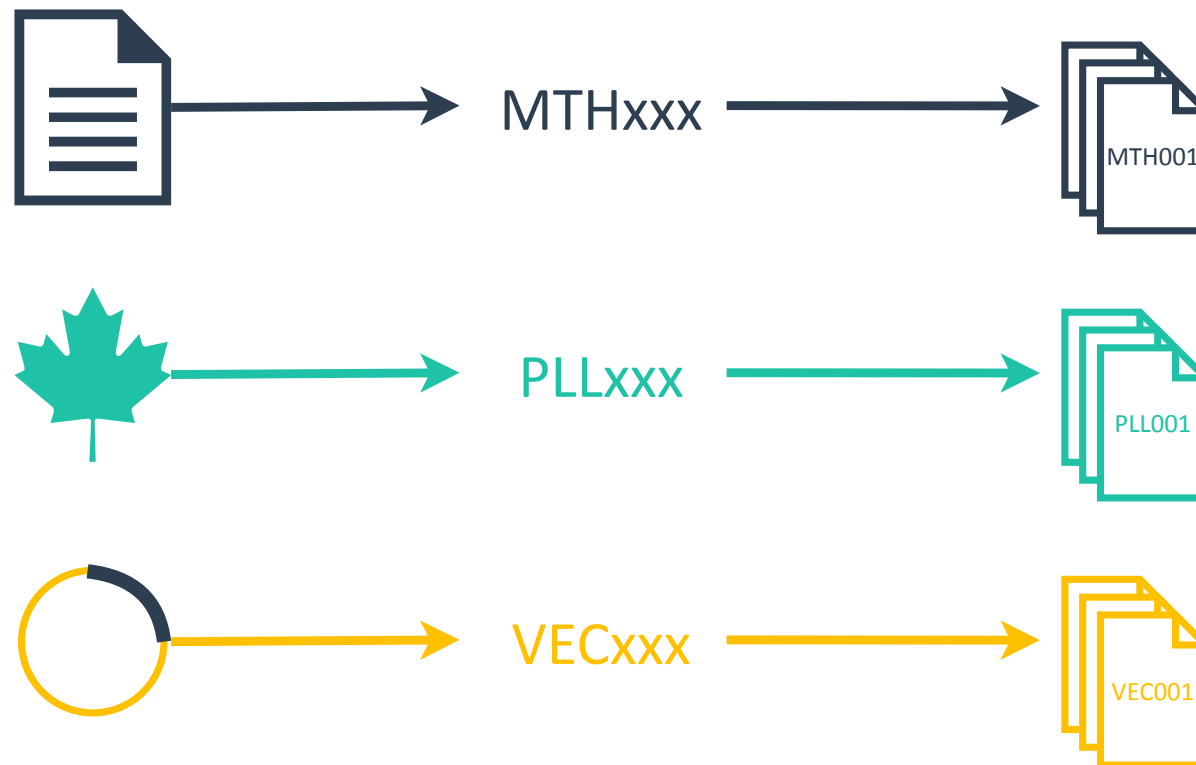
Local ARCs - Project overview

inv001-talinum-cam
inv002-arabidopsis-heat
inv003-welwitschia-clock

Local ARCs - Project overview

Local ARCs - Protocols

DataHUB

https://git.nfdi4plants.org

Example ARC DataHUB - project overview

Example ARC DataHUB - ARC overview

Example ARC DataHUB - assay protocols

Example ARC DataHUB - protocol detail

elabFTW - Overview

elabFTW data is mainly

divided in two main panels

Experiments

Database

Experiment Panel

The `Experiment` panel is the default "working area" for protocols of daily lab work
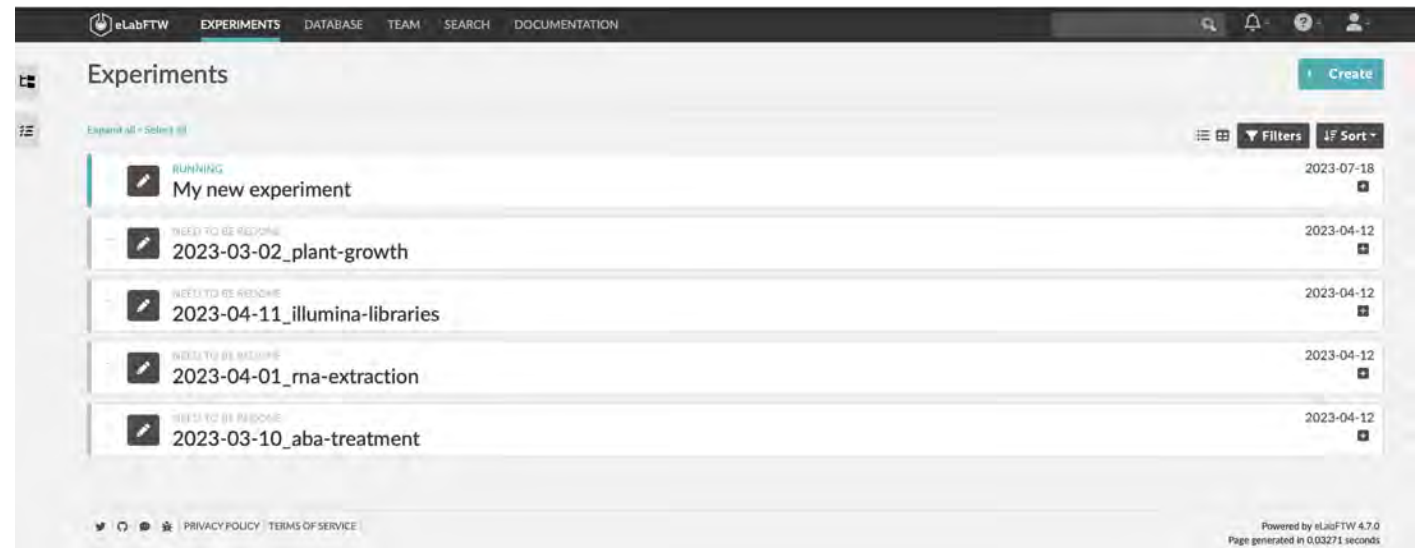
Database Panel

The `Database` panel is elabFTW's place to categorize contents

Database item types

💡 Item types can be defined in the

`Admin Panel`

Preparing database lists for elabFTW import

💡 elabFTW offers batch-import from csv.

- elabFTW offers to import data from a csv file as described here:

  https://doc.elabftw.net/user-guide.html#importing-from-a-csv-file

- These can be imported as any type of database item or experiment

- elabFTW-specific columns
  - `title` : will be the displayed name of the individual item
 - `tags` : (separated by `|`) will be used as tags

Database import

# Database import example - Investigations

`db_investigations.csv`

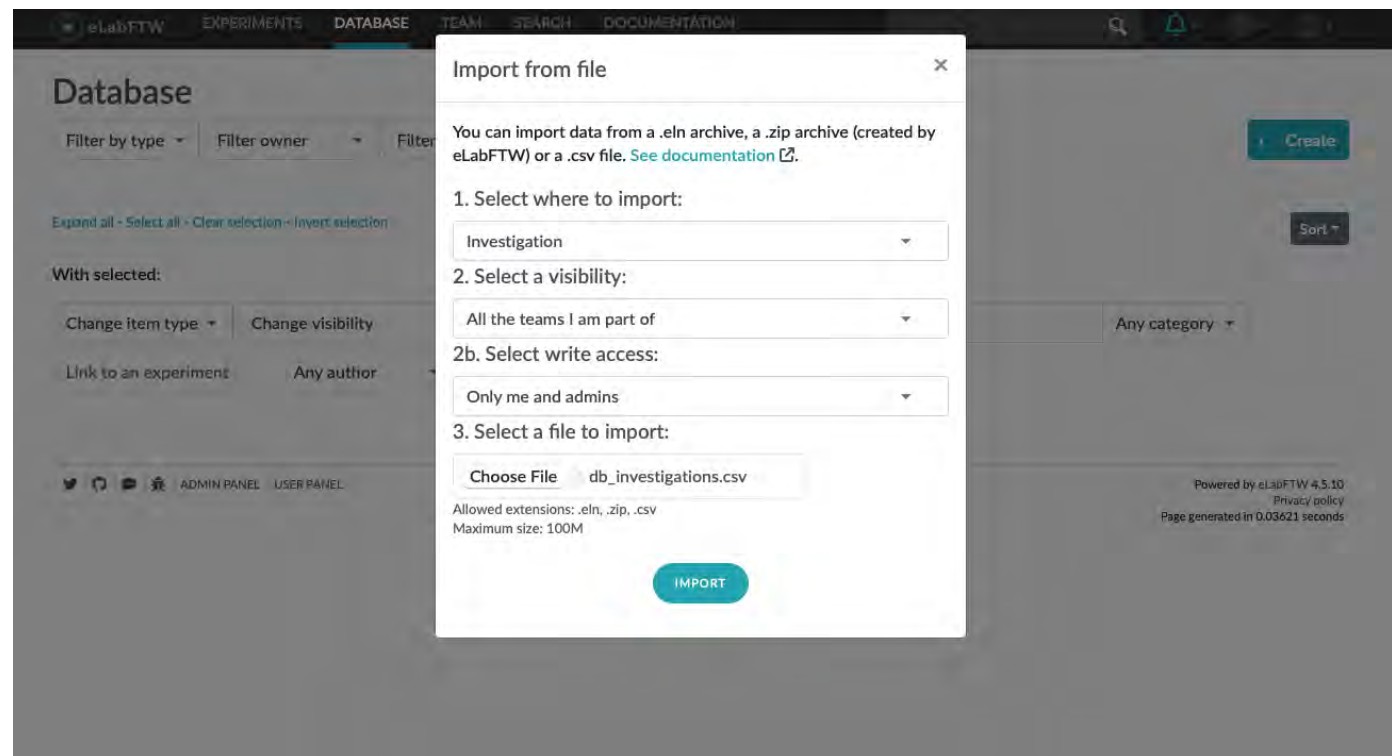| title	tags	Investigation Identifier	Investigation Person Last Name	Investigation Person First Name	Investigation Email
inv001-talinum-cam	inv001-talinum-cam	inv001-talinum-cam	Beetroot	Jasmine	jasmine.beetro... uni.org
inv002-arabidopsis-...	inv002-arabidopsis-...	inv002-arabidopsis-...	Sage	Oliver	oliver.sage@ar... uni.org

Database import example - Studies

`exp_inv001–talinum–cam_studies.csv`

title	tags	Study Identifier	Study Title	Study Description
sty01-aba-pre-experiment	inv001-talinum-cam	sty01-aba-pre-experiment	Pre-experiment to test ABA treatment	ABA treatment
sty02-aba-full	inv001-talinum-cam	sty02-aba-full	Large scale experiment with ABA	ABA treatment

Database import

Database import

Database Panel

Linking / grouping items

💡 Two mechanisms

1. Tags

i. user-friendly, easy way to group items

2. Linking

i. Database items

ii. Experiment items

Linking items

In edit mode

Linked items

elabFTW – Conclusion

Good

- Documenting daily lab routine
- Lab methods & protocols
- Lab inventory (biologicals, chemicals, instruments)
- Local sharing & collaboration
- Backup (locally)

Intermediate

- Version control
- Track changes / contributions
- Use of IDs
- External sharing

Limited

- Data storage
- Analyses
- Structured metadata
- PIDs