COBREX

IPAG

COBREX week

Banyuls - 5 october 2022

COBREX DC

COBREX DC

- How cobrex-dc works (from the basics)
  - Use cases
  - Software architecture
  - Some hardware elements

=> how it is fitting with cobrex requirements ?

COBREX DC use cases

What is the use of COBREX-DC ?

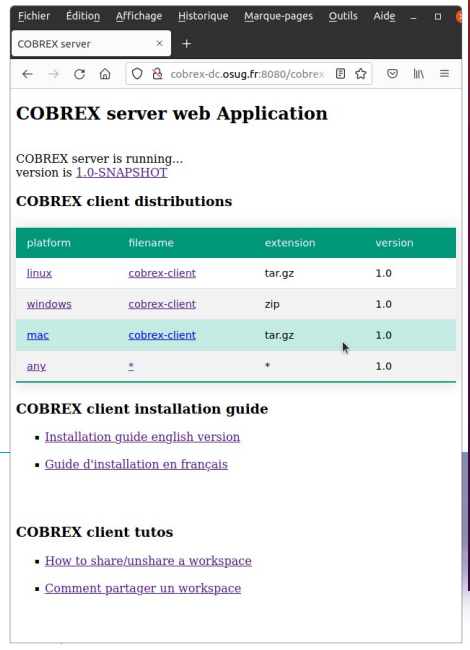
- Global use and purpose :
  automate a large number of reductions applied to many star targets aiming to detect exoplanets and disks

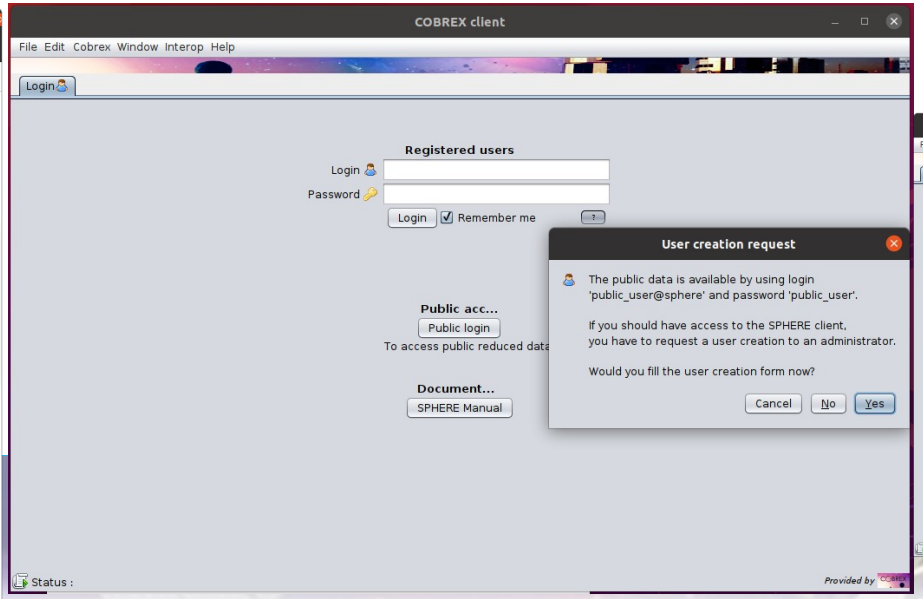
  => TO achieve this : the global use case is subdivided in elementary use cases:
  - Store and retrieve star observation data cubes
  - Upload / Code reduction recipes and workflows of reductions
  - Run single process: recipes applied to selected obs data
  - Run batch: workflows applied to selected observation nights
  - Automate the run of processes on several data
  - Automate the run of workflow on several data

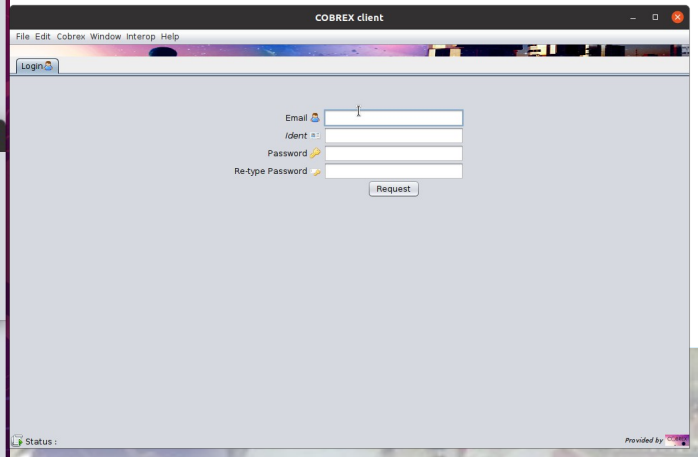
COBREX DC use cases

How to use COBREX-DC ?

- Cobrex-dc relays on a client / server architecture (more details later)
- Register to cobrex-dc :
  1. Download and install cobrex-client from http://cobrex-dc.osug.fr/cobrex-server
     see install doc at http://cobrex-dc.osug.fr/cobrex-server/cobrex-client/docs/README.html
  2. Run cobrex-client
  3. Ask registration from the cobrex-client login panel







COBREX DC use cases

How to use COBREX-DC ?

Then once registered, the majority of use cases can be done through cobrex-client features

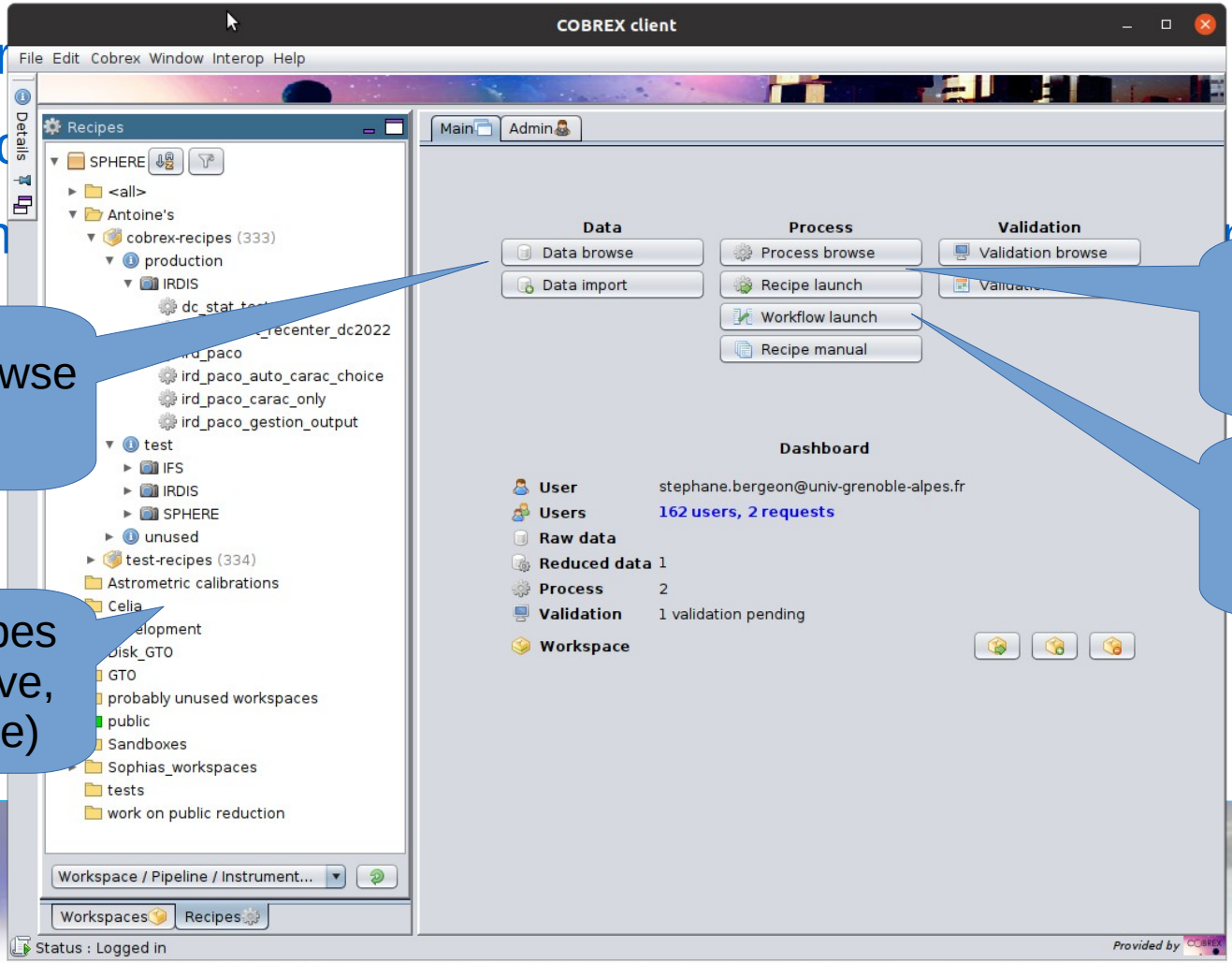
- Store and browse data
- Upload / Code recipe
- Run process (recipe / data) and monitor their execution
- Run workflow (batch of processes)
- ...

COBREX DC use cases

How to use COBREX-DC ?

Then once registered, the majority of use cases can be done through cobrex-client features

- Stor
- Uplo
- Run



Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow

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COBREX DC

Use cases

- Manage Data
- Manage Recipes
- Manage Processes
- Manage Workflows

- Software architecture
- Some hardware elements

COBREX DC

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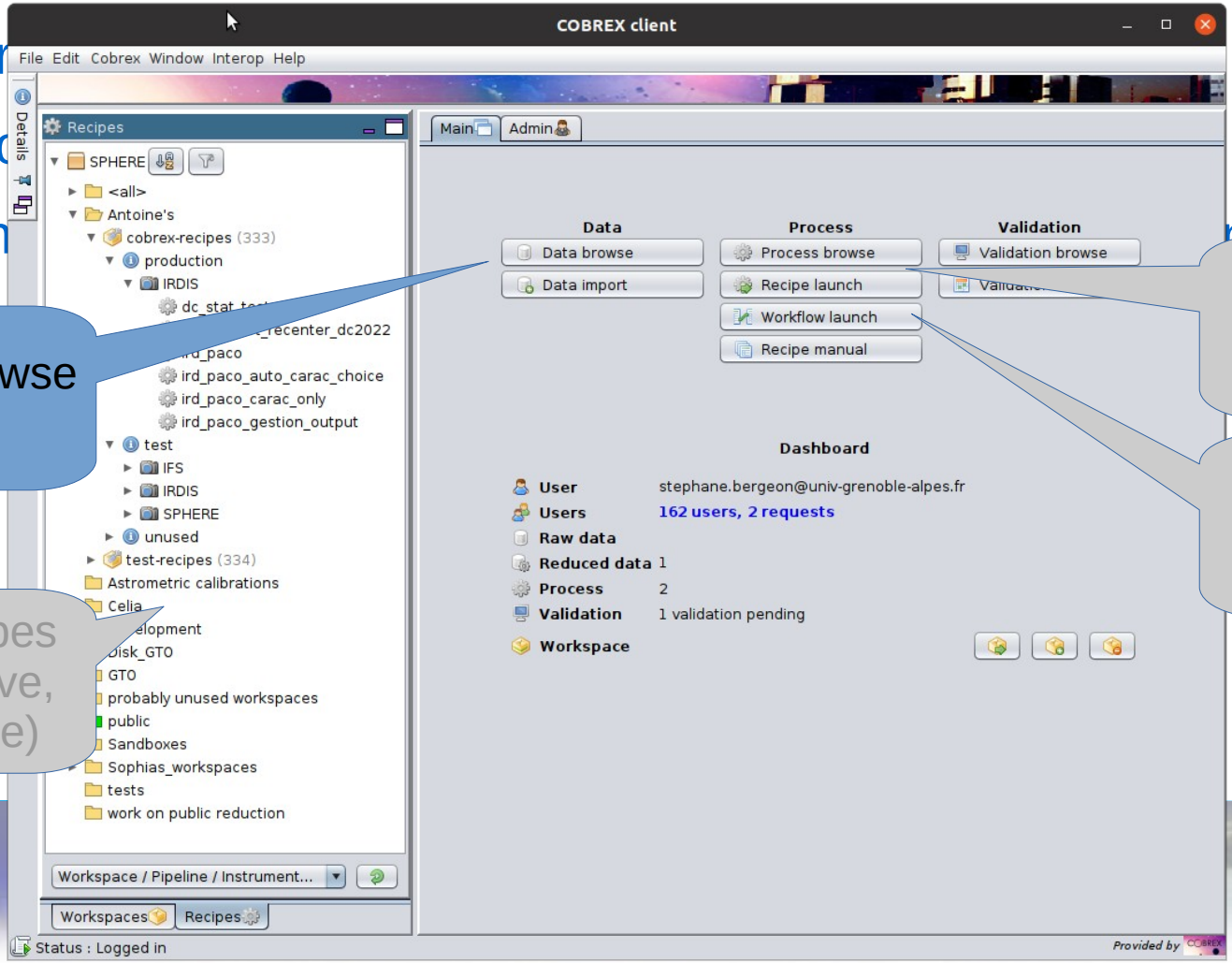

Import and browse data

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COBREX DC data

How data is stored and how retrieve data ?

- Import observations into cobrex dc
  - A dedicated feature in the cobrex-client
  - Store the observation into de cobrex database and file on disk:
    - The observed star
    - The associated frame type
    - The user who imported the observation
    - The path to the file related to this data
    - The observation date
    - Other observation parameters (coronography, filter...)

COBREX DC data

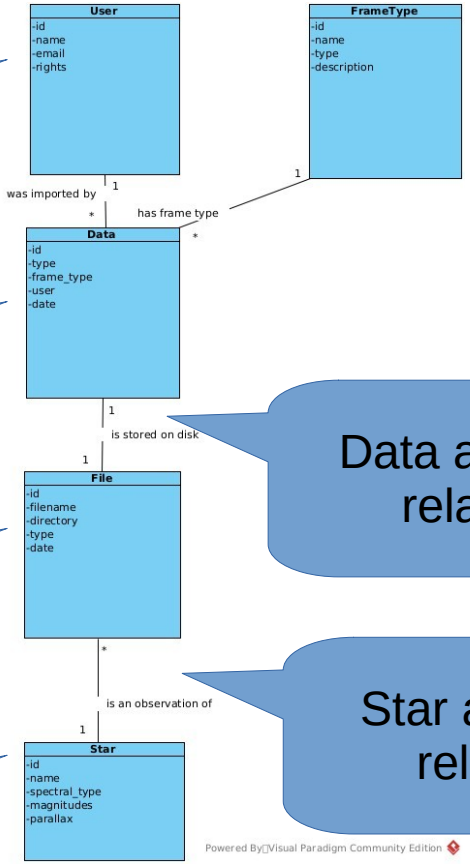
How data is stored and how retrieve data ?

Info about the registered user who stored the data

Data

Where to find data file stored on disk

Data about the observed star



Data and file relation

Star and file relation

Database model

data model (simplified)

5 main tables:

- user,
- data,
- file,
- star,
- frame type

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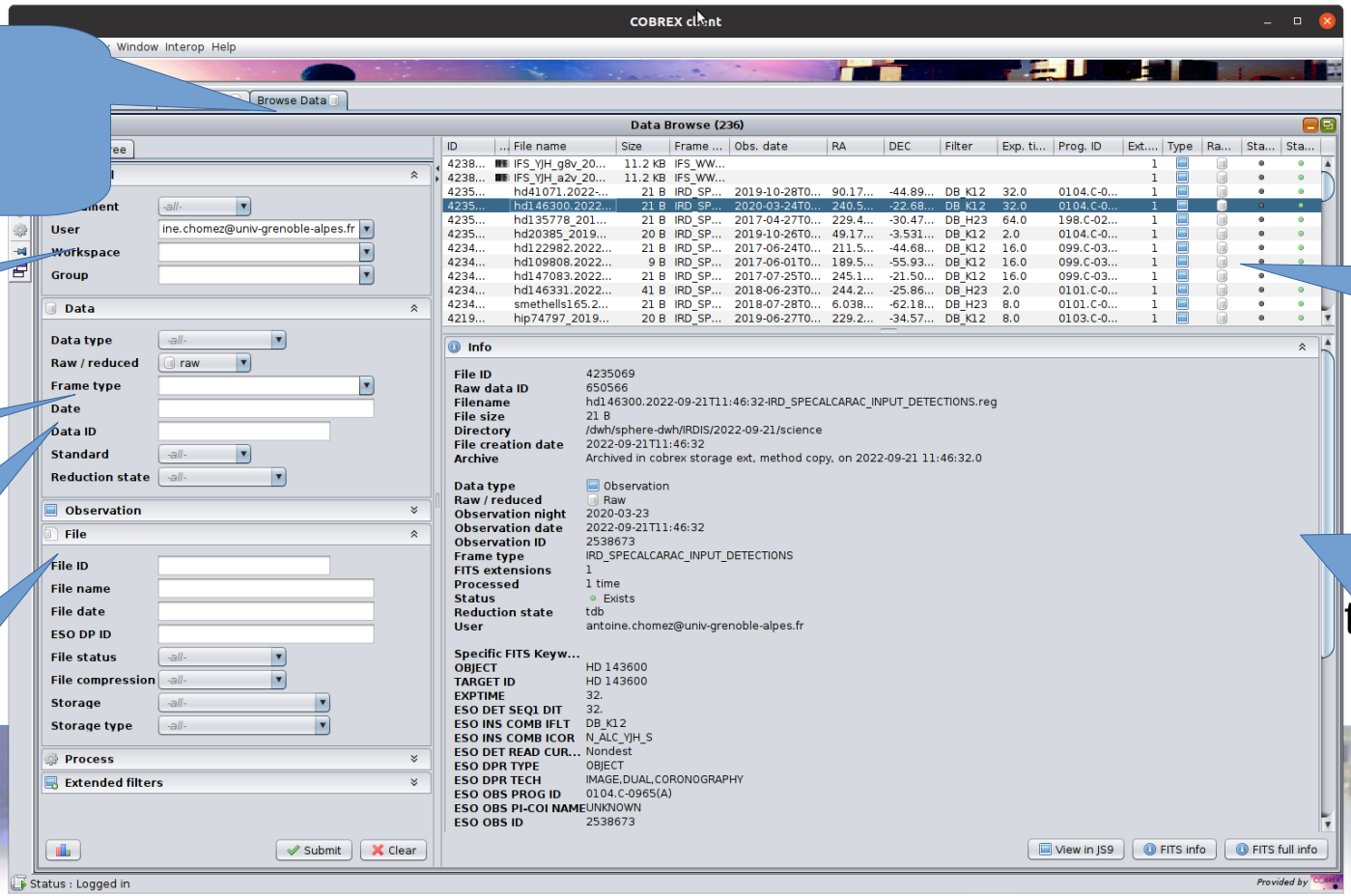
COBREX DC data

How data is stored and how retrieve data ?

- Retrieve data through cobrex-client
  - The data browser provides filter components to run the SQL select queries onto the database



Browse Data tool

Filter by user

by frame type

by date

by star

List of filtered data

Details of the selected data among the list

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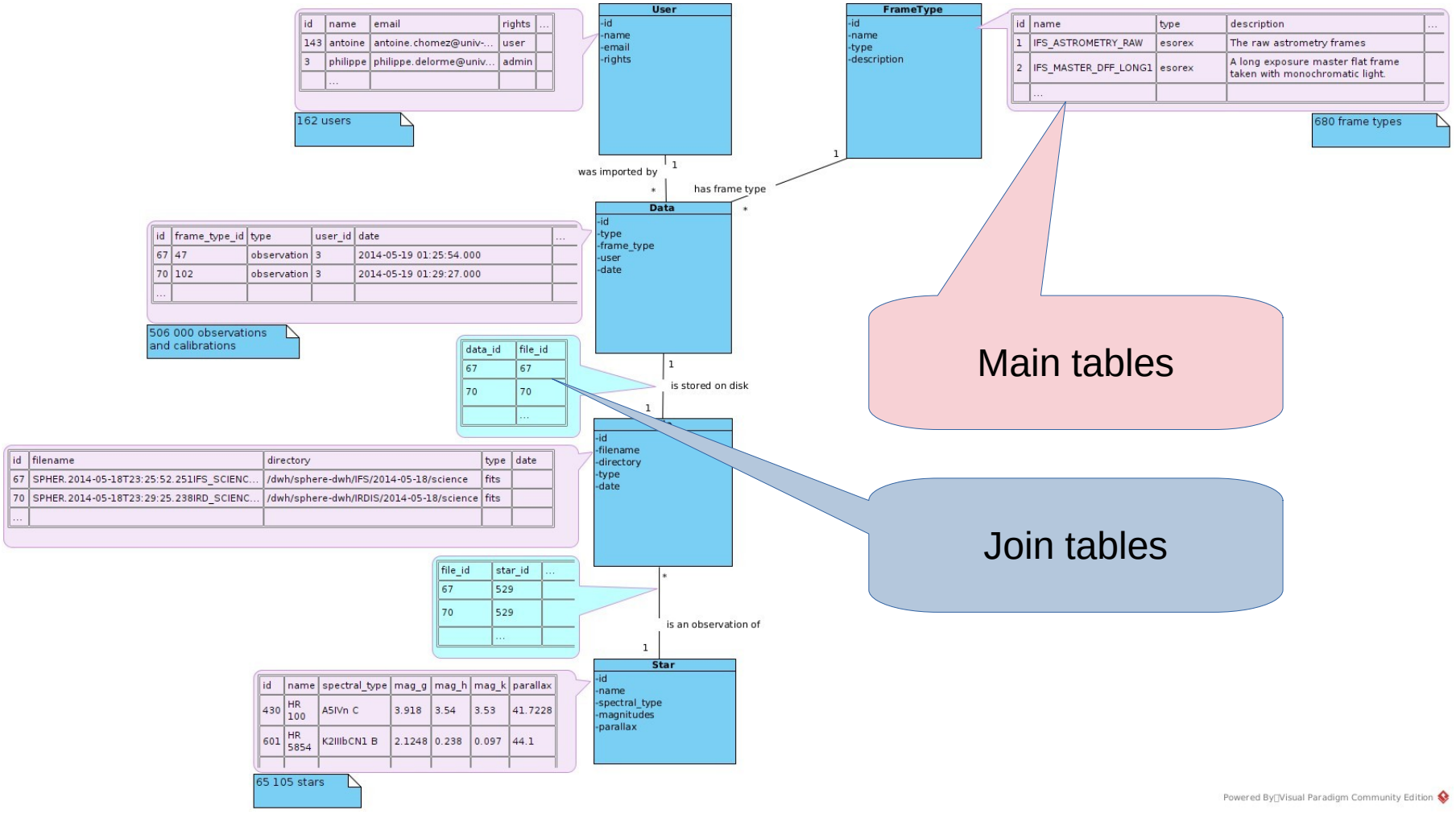
COBREX DC data

How data is stored and how retrieve data ?



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COBREX DC data

How data is stored and how retrieve data ?

- Retrieve data from database
  - The implemented database is MySQL database (Mariadb)
  - > Data can be selected using SQL queries with criteria
- Examples of SQL query:
  - Retrieve all data imported by Antoine ?

```
1   SELECT * FROM raw_data where user_id=143;
```

  - Retrieve all data related to star HR 100 ?

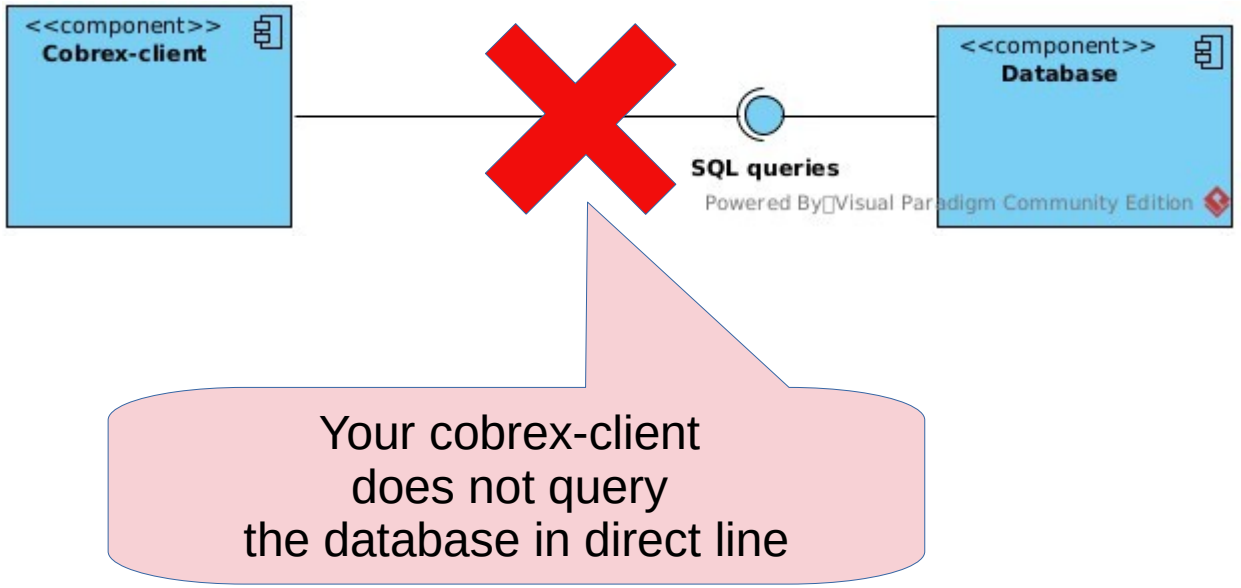
```
1   select rdf.raw_data_id from raw_data_file rdf
2   join file_star fs
3   join star s
4   on fs.file_id=rdf.file_id
5   where s.identifier='HR 100';
6   --
```

  - Retrieve all data with IFS_ASTROMETRY_RAW frame type...
  - Retrieve all data with star HR100 and with IFS_ASTROMETRY_RAW frame type and imported by Philippe...

COBREX DC data

How data is stored and how retrieve data ?

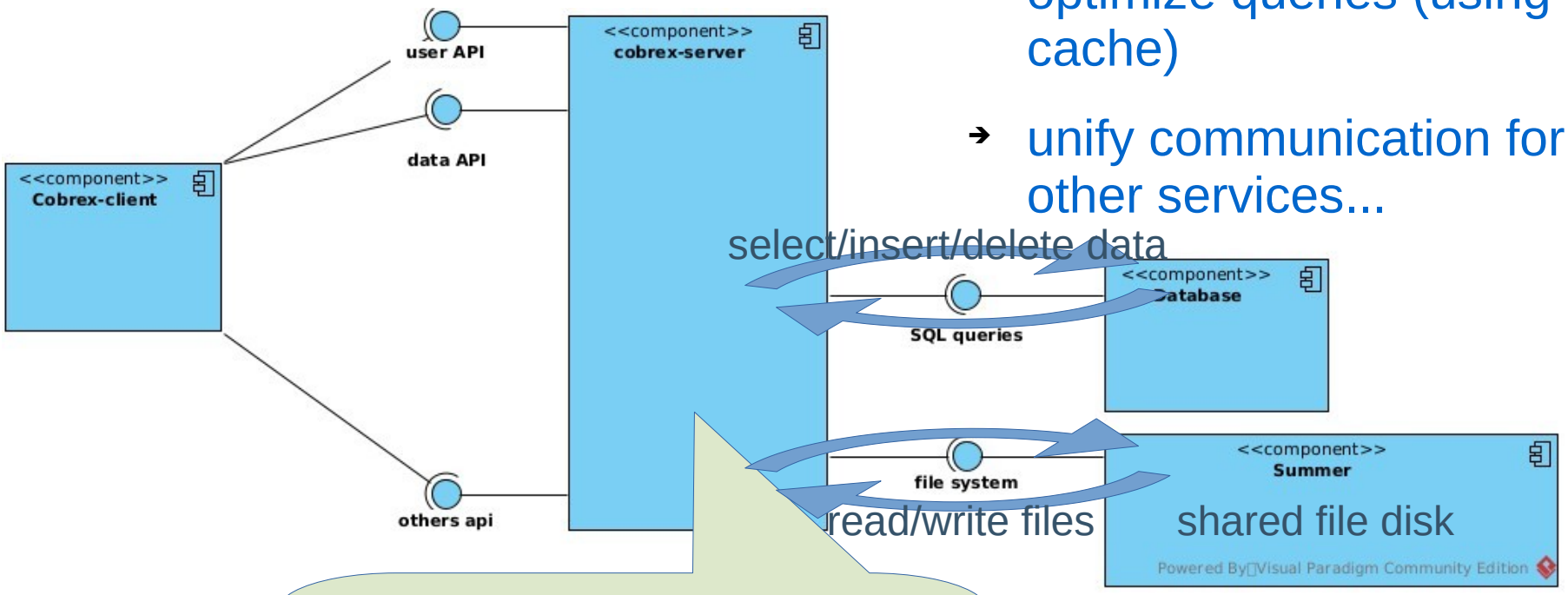
- Retrieve data though cobrex-client
  - The data browser provides filter components to run the SQL select queries onto the database



COBREX DC data

SW Architecture / data management

- **Client-server architecture**

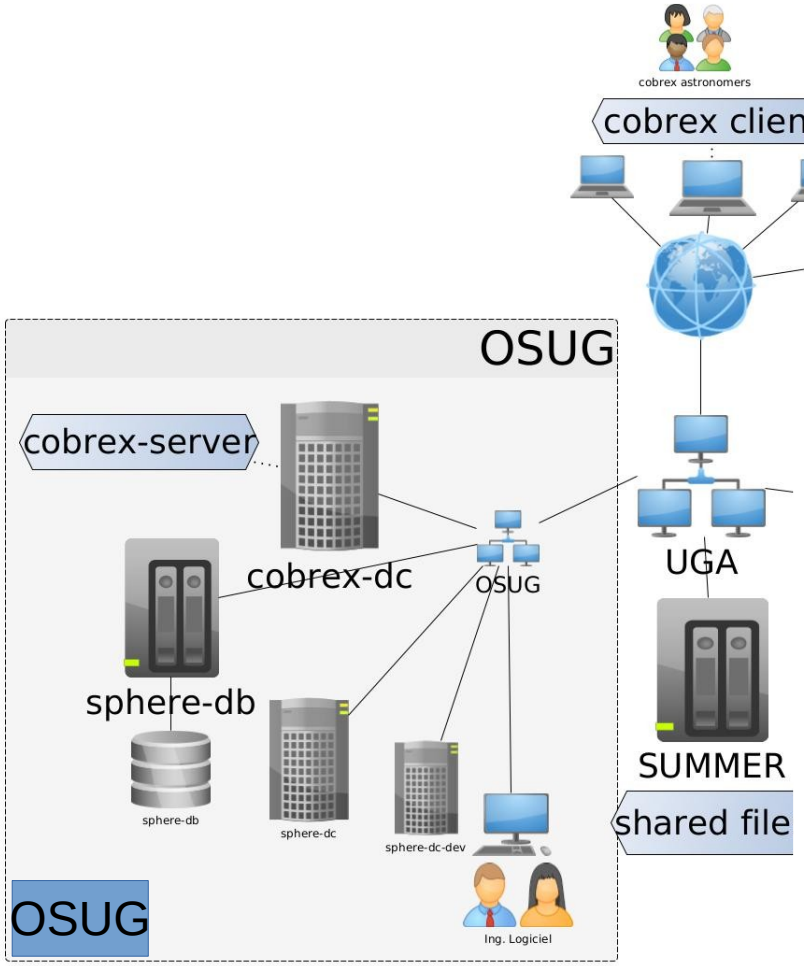


- restrict access
- avoid sql overload
- optimize queries (using cache)
- unify communication for other services...

Cobrex-server provides dedicated api
front-end web-service (REST)
and runs sql queries + files IO
in back-end

COBREX DC data

HW Architecture / data management



Connection to unistra simbad to update sphere star table with new star targets

COBREX DC

Use cases

- Manage Data
- Manage Recipes
- Manage Processes
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- Software architecture
- Some hardware elements

COBREX DC use cases

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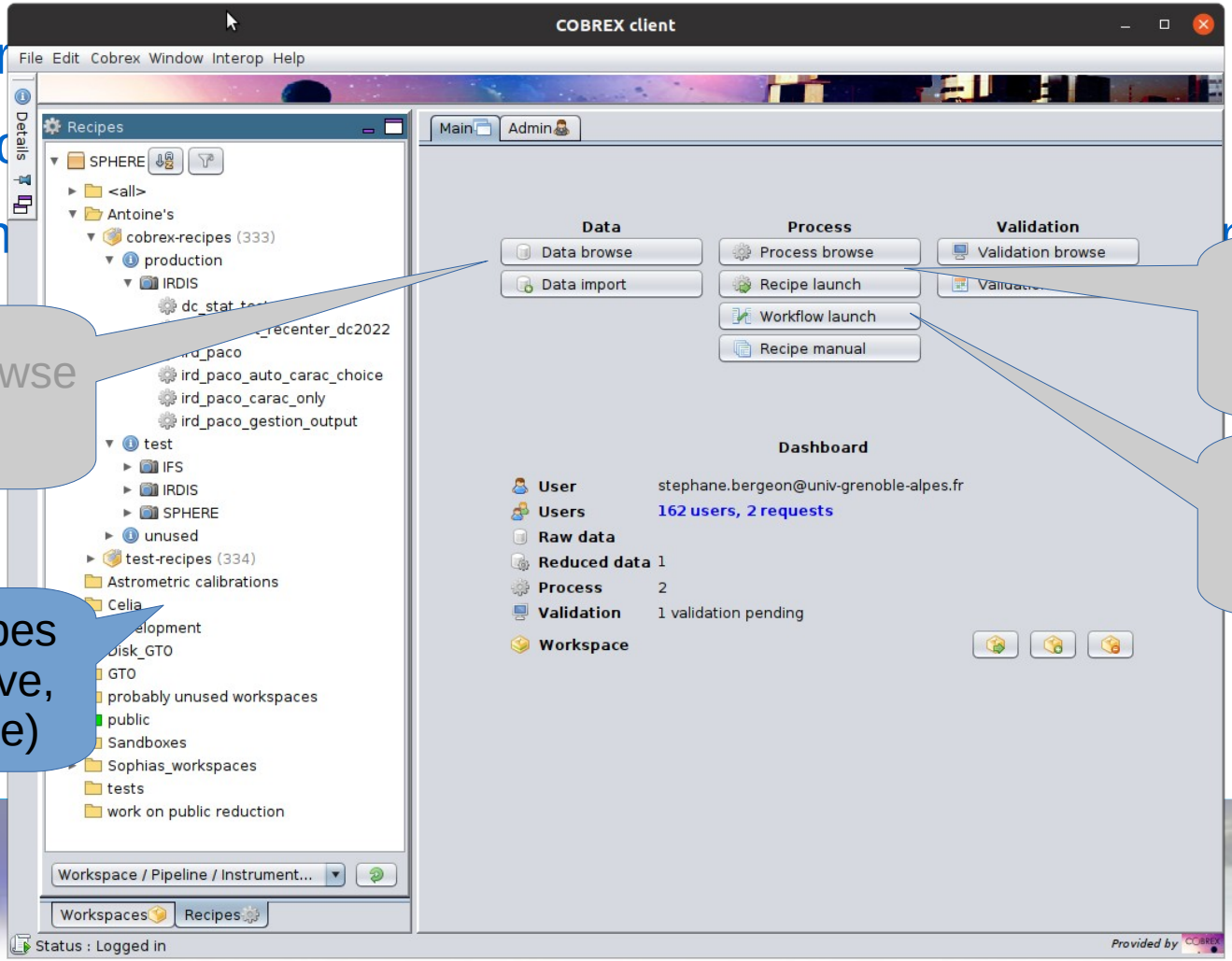

Import and browse data

Run and browse process

Run workflow

Manage recipes (create, remove, edit, organize)

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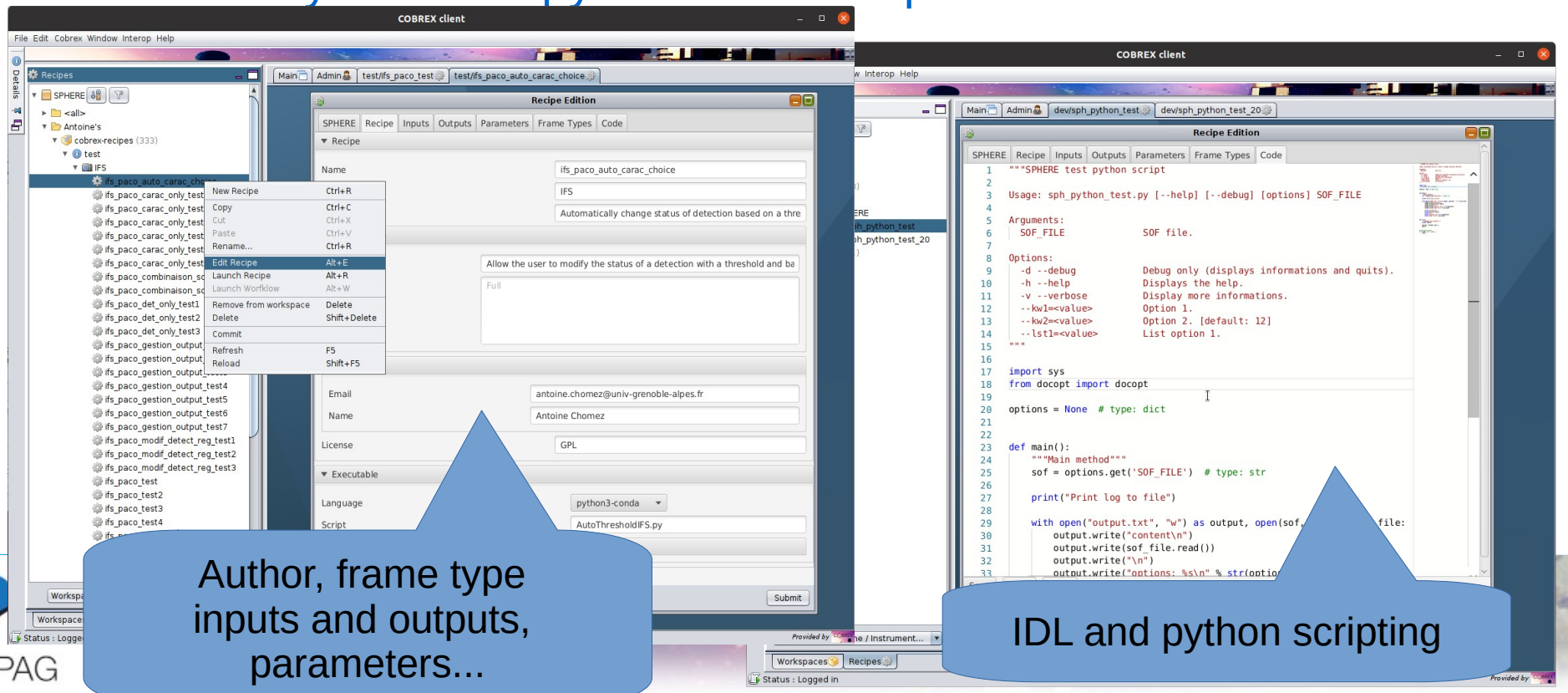
COBREX DC recipes

How import recipe ?

- Import reduction recipe into cobrex dc
  - Through the dedicated recipe editor feature in the cobrex-client…
    - Create new recipes
    - Modify / edit / copy / remove recipes



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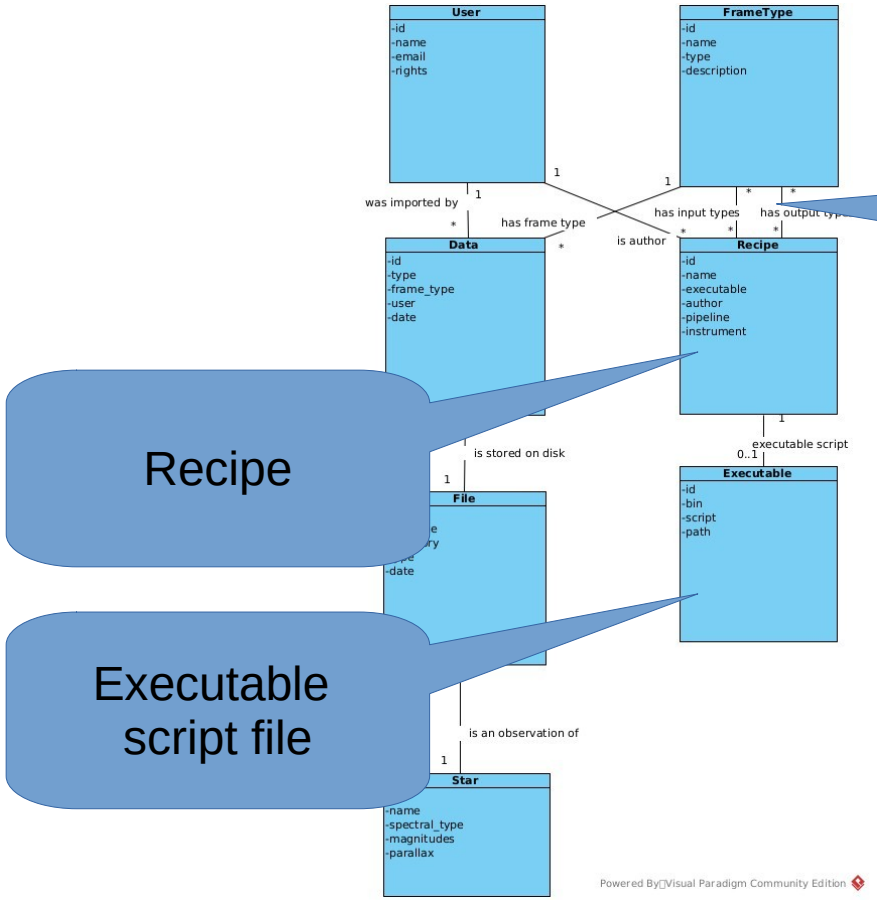
COBREX DC data

Recipes are stored in database



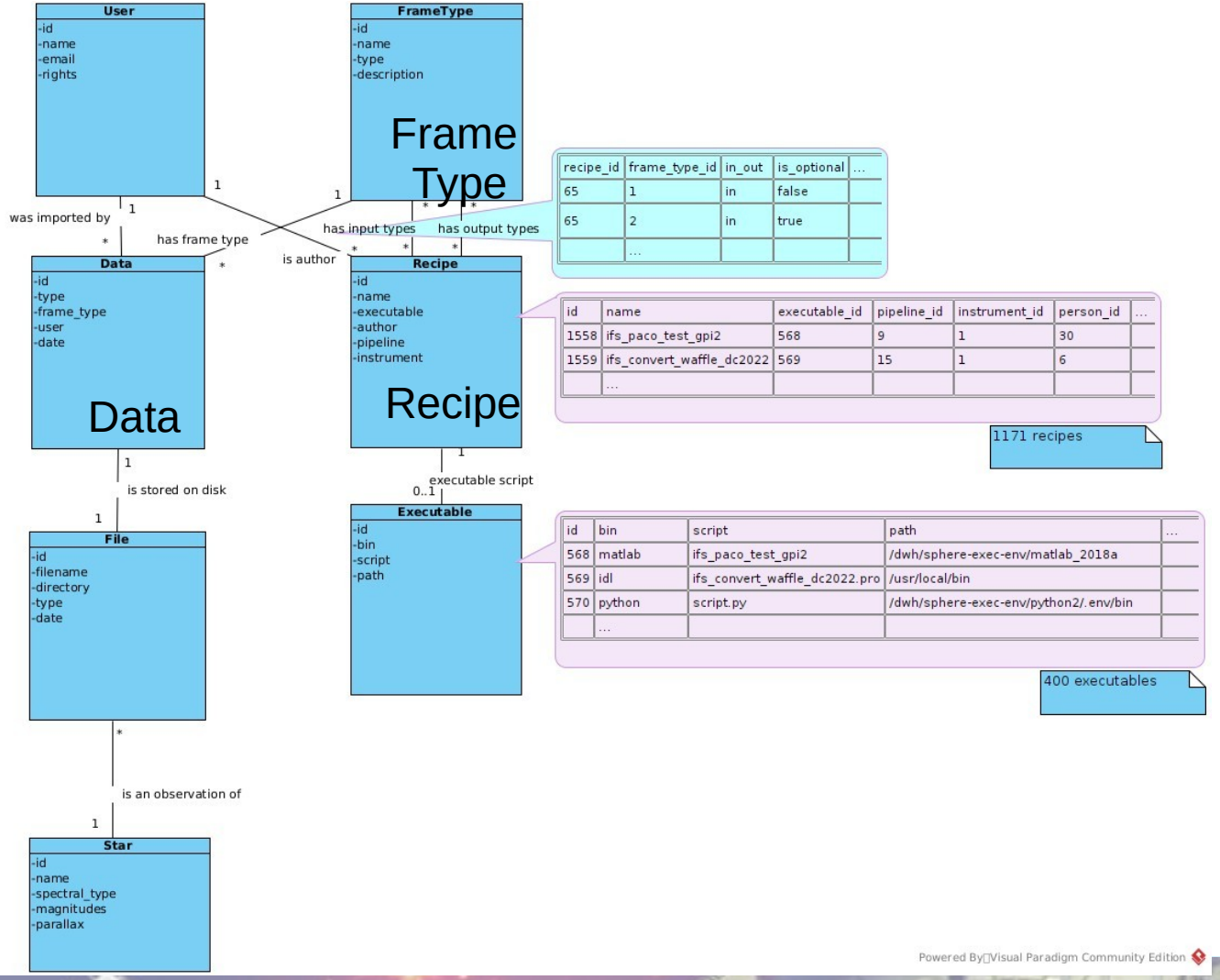
Recipe - Frame type inputs / outputs relations

Recipe

Executable script file

COBREX DC recipes

How recipes are stored ?



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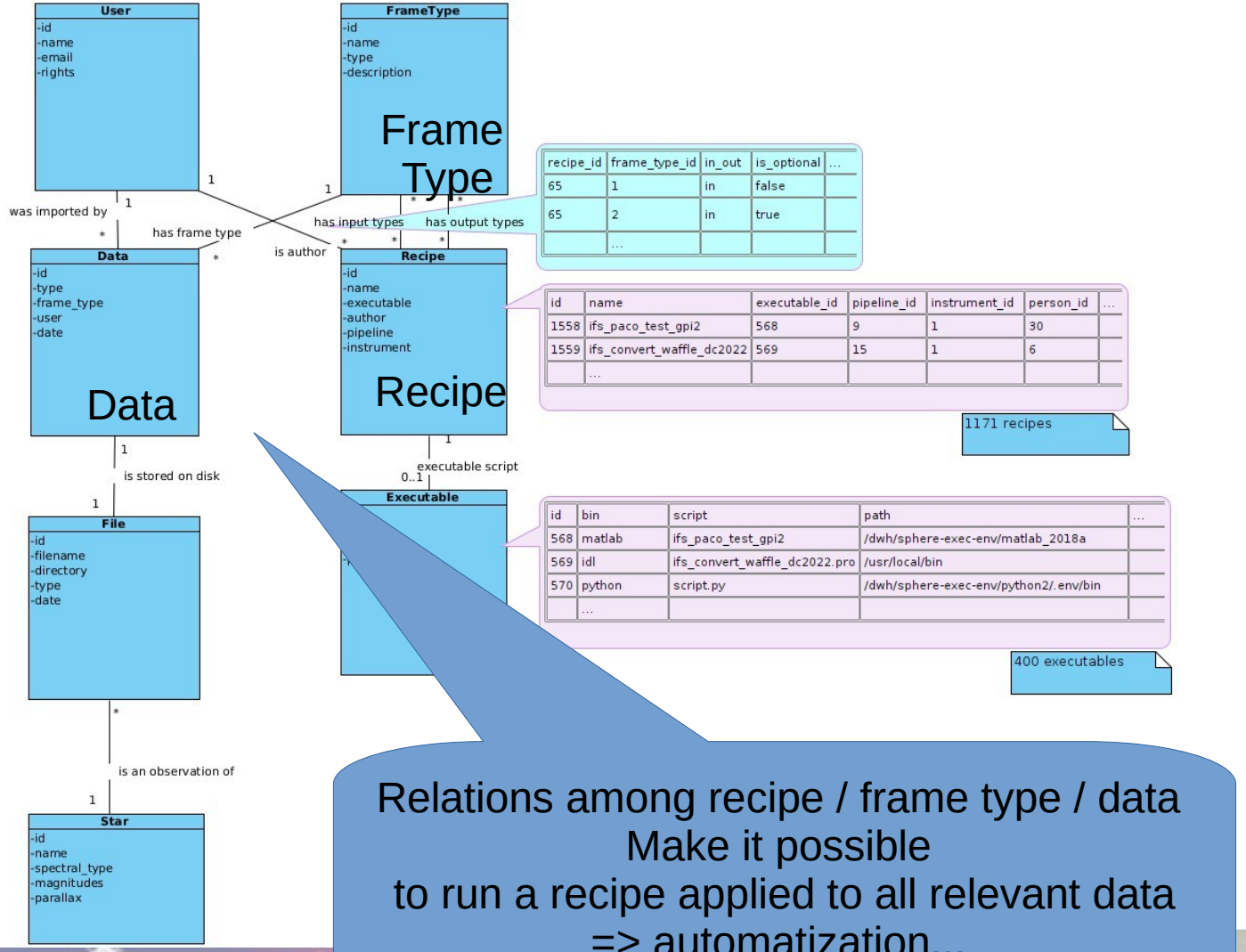
COBREX DC recipes

How recipes are stored ?



Relations among recipe / frame type / data
Make it possible
to run a recipe applied to all relevant data
=> automatization...

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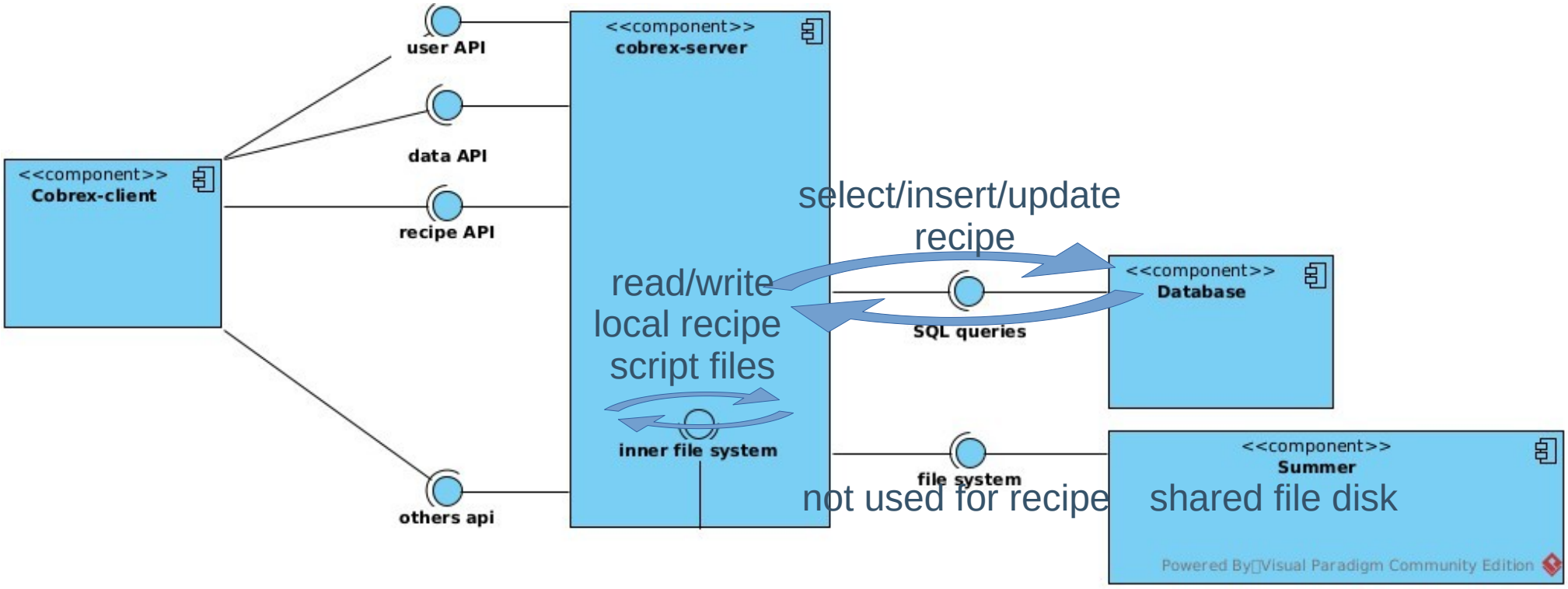
COBREX DC data

SW Architecture / recipe management



COBREX DC

- Use cases
  - Manage Data
  - Manage Recipes
  - Manage Processes
  - Manage Workflows
- Software architecture
- Some hardware elements

COBREX DC use cases

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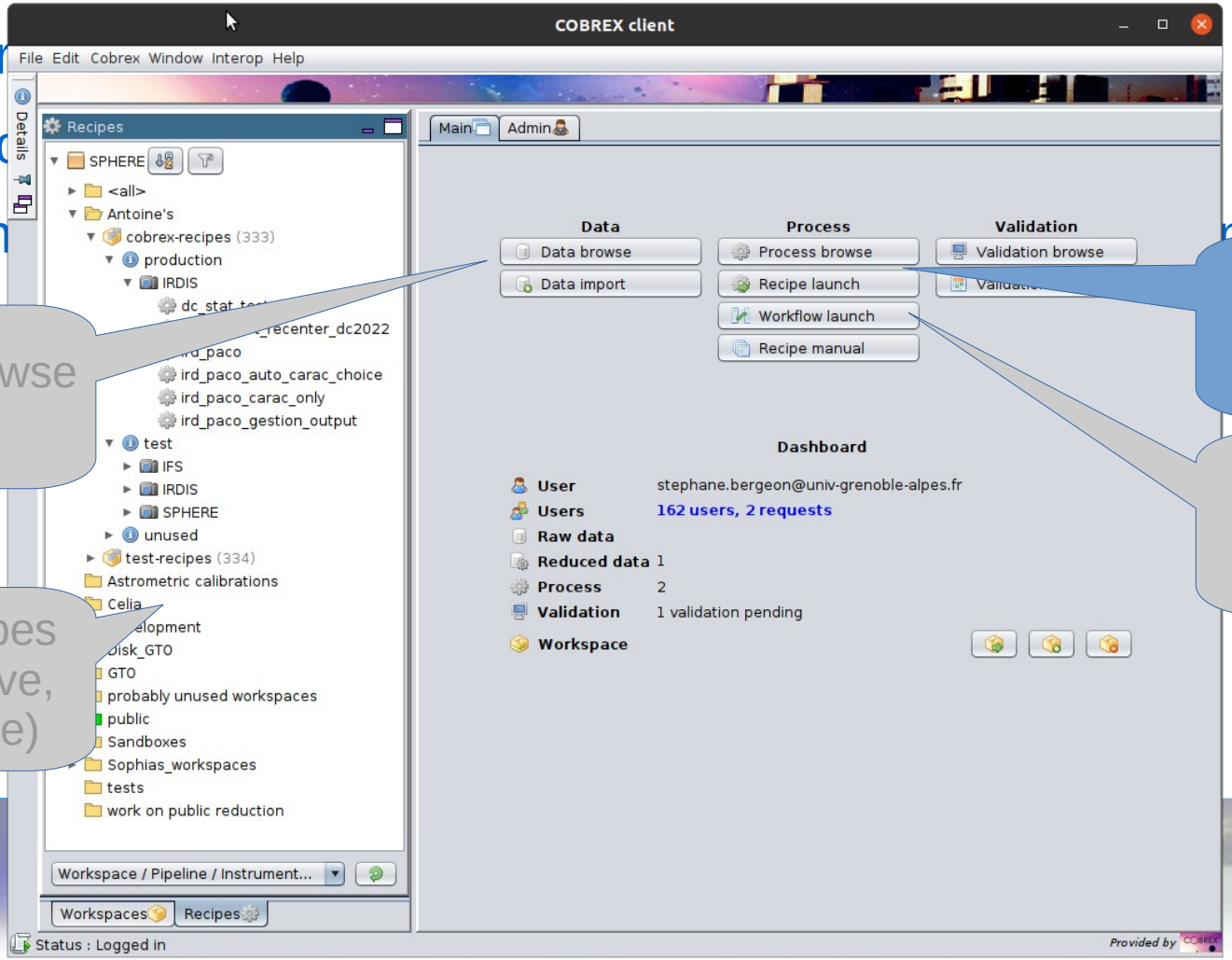

Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow

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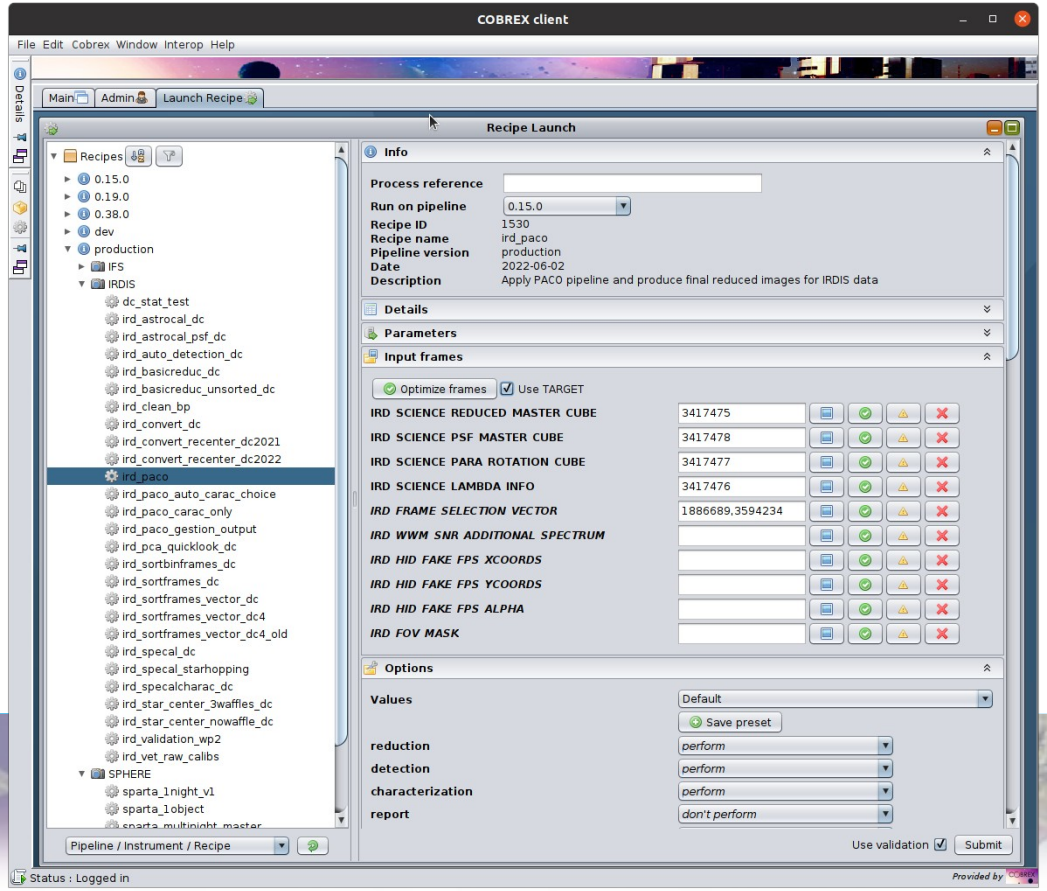
COBREX DC processes

How to run recipe applied on data?

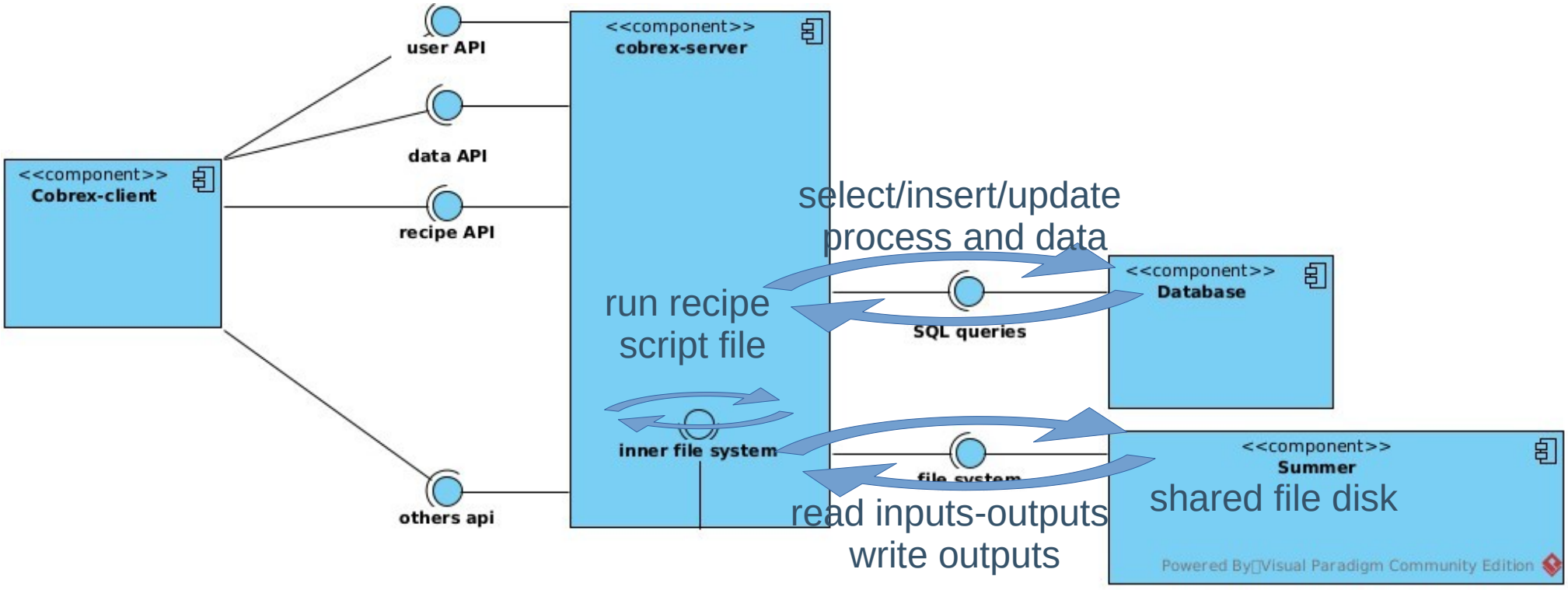
- Run process on cobrex-dc
  - Through the “Launch Recipe” feature in the cobrex-client…
    - Select the recipe to be run
    - Apply data
    - Association rules
    - Set parameters

Process =
One execution of a recipe
for one set of inputs and parameters



COBREX DC data

SW Architecture / launch recipe



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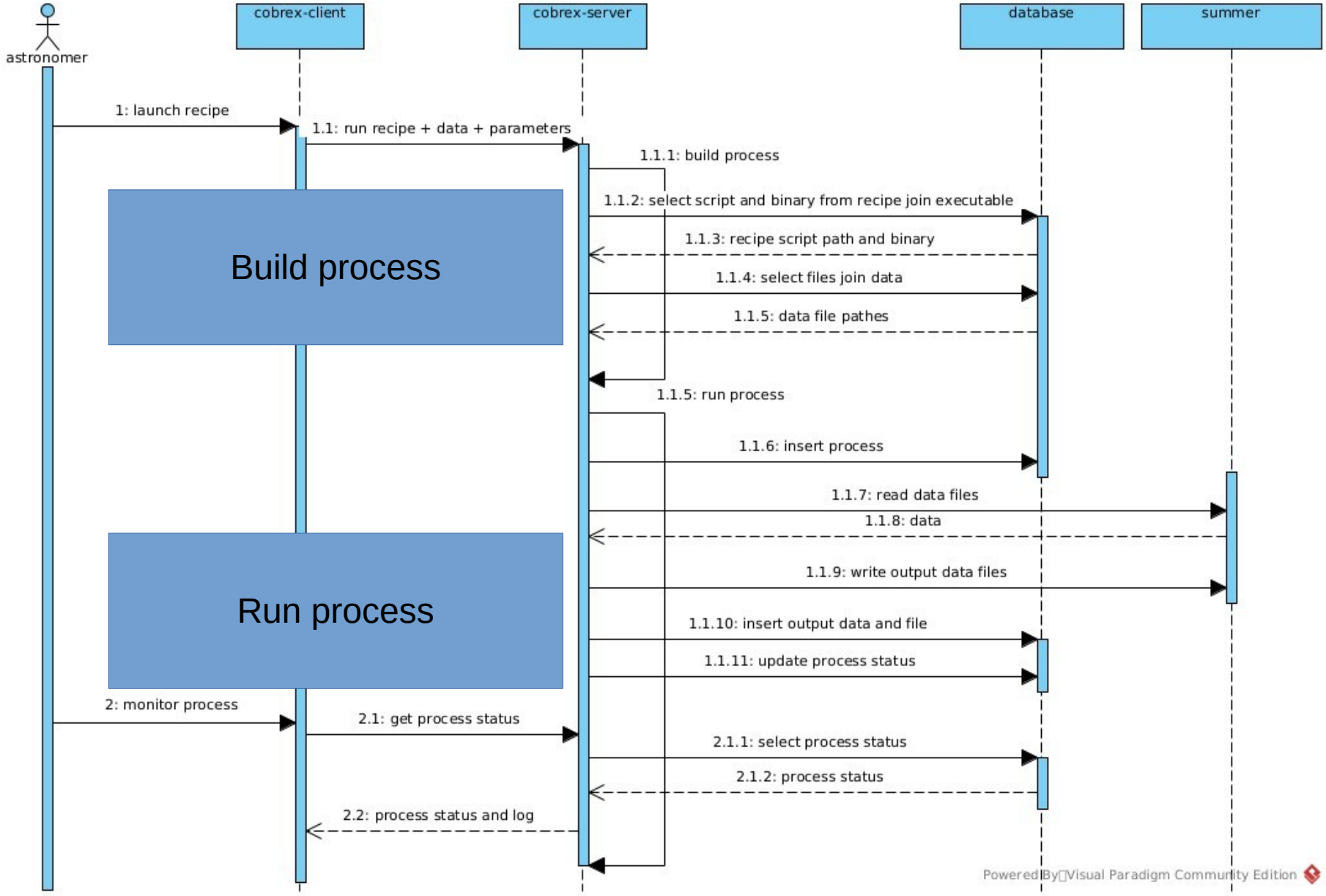
COBREX DC data

SW Architecture / launch recipe sequence



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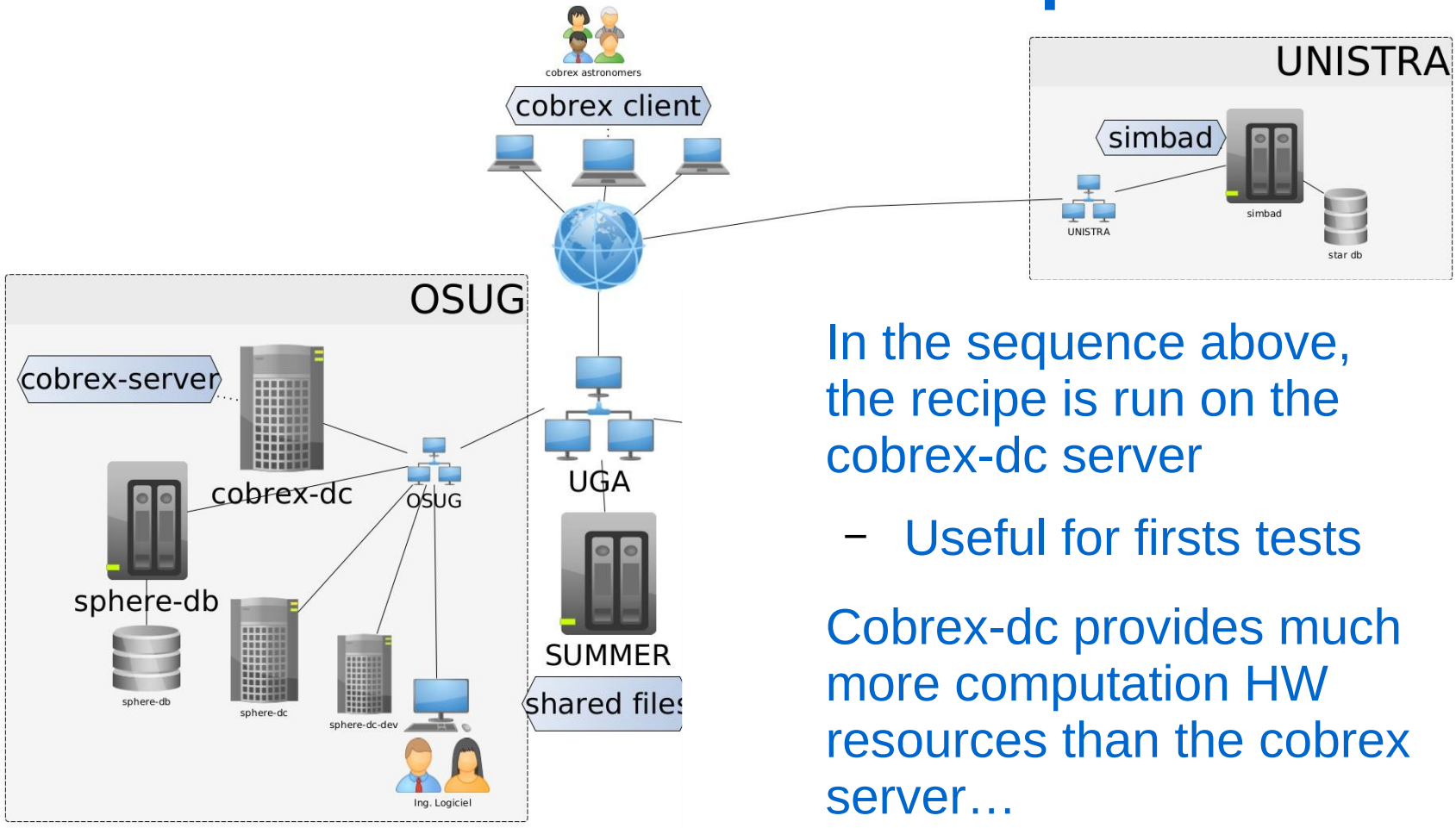
COBREX DC data

HW Architecture / launch recipe



In the sequence above, the recipe is run on the cobrex-dc server

- Useful for firsts tests

Cobrex-dc provides much more computation HW resources than the cobrex server…

- Key point to achieve massive automated reductions !

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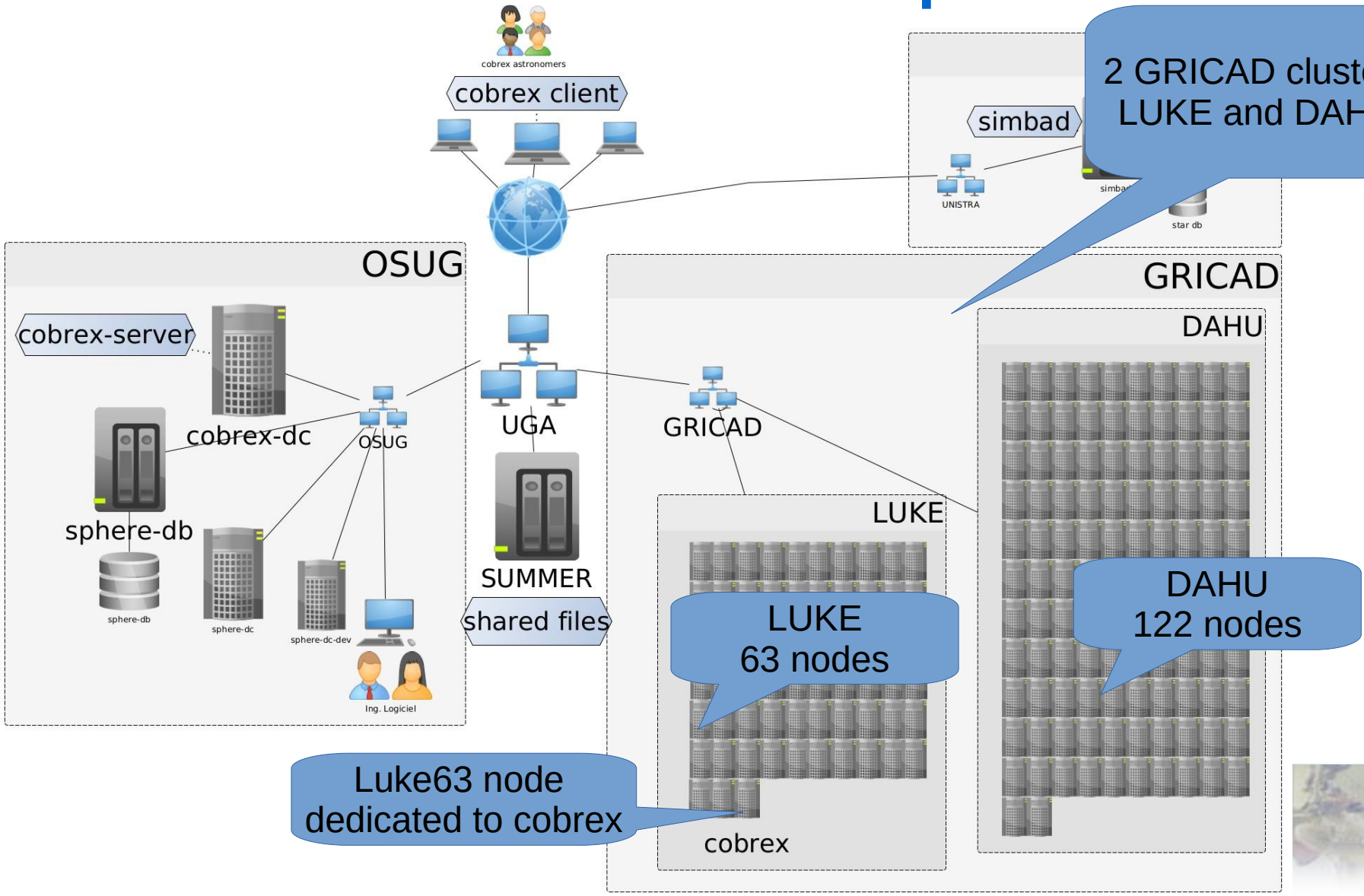
COBREX DC data

HW Architecture / launch recipe



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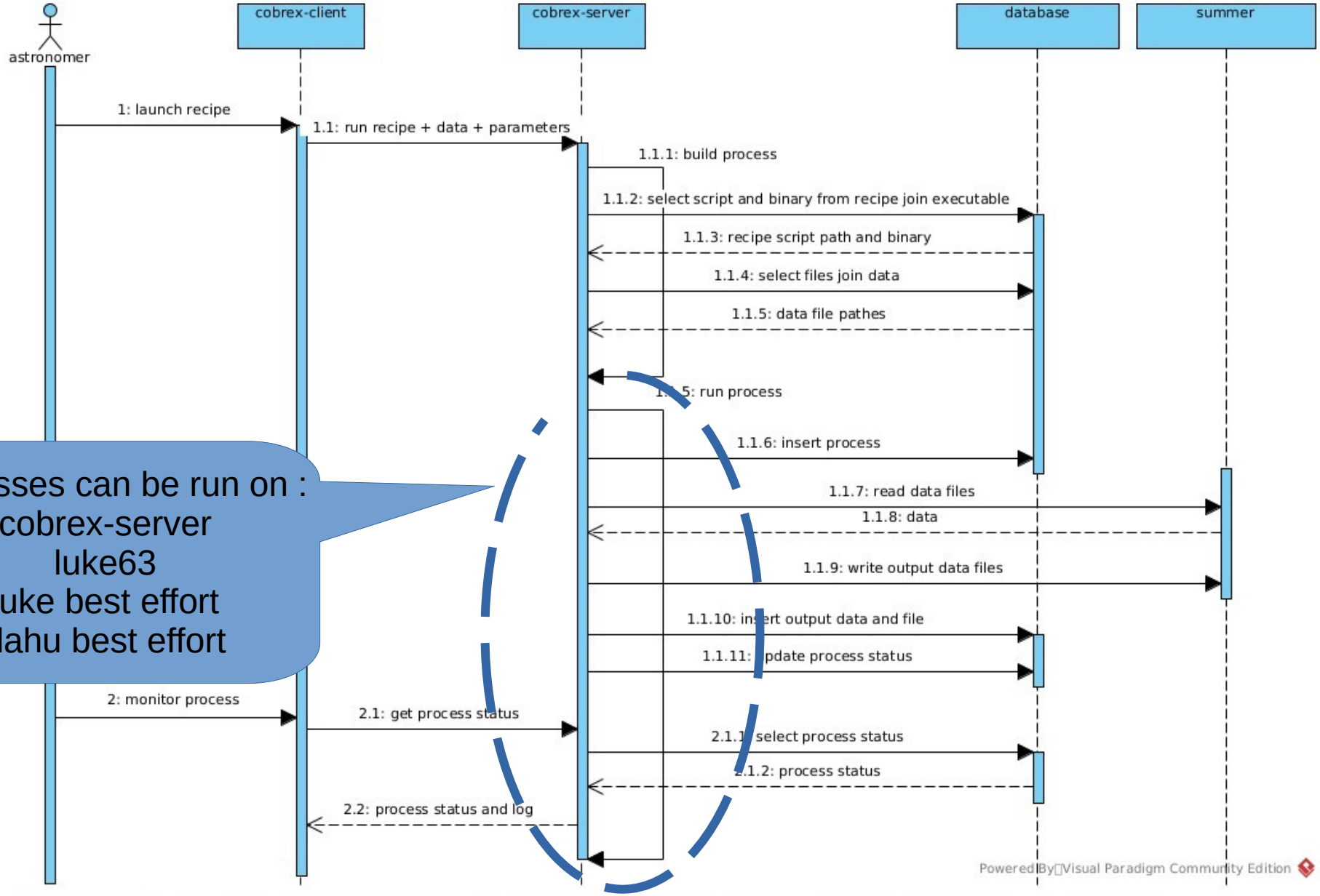
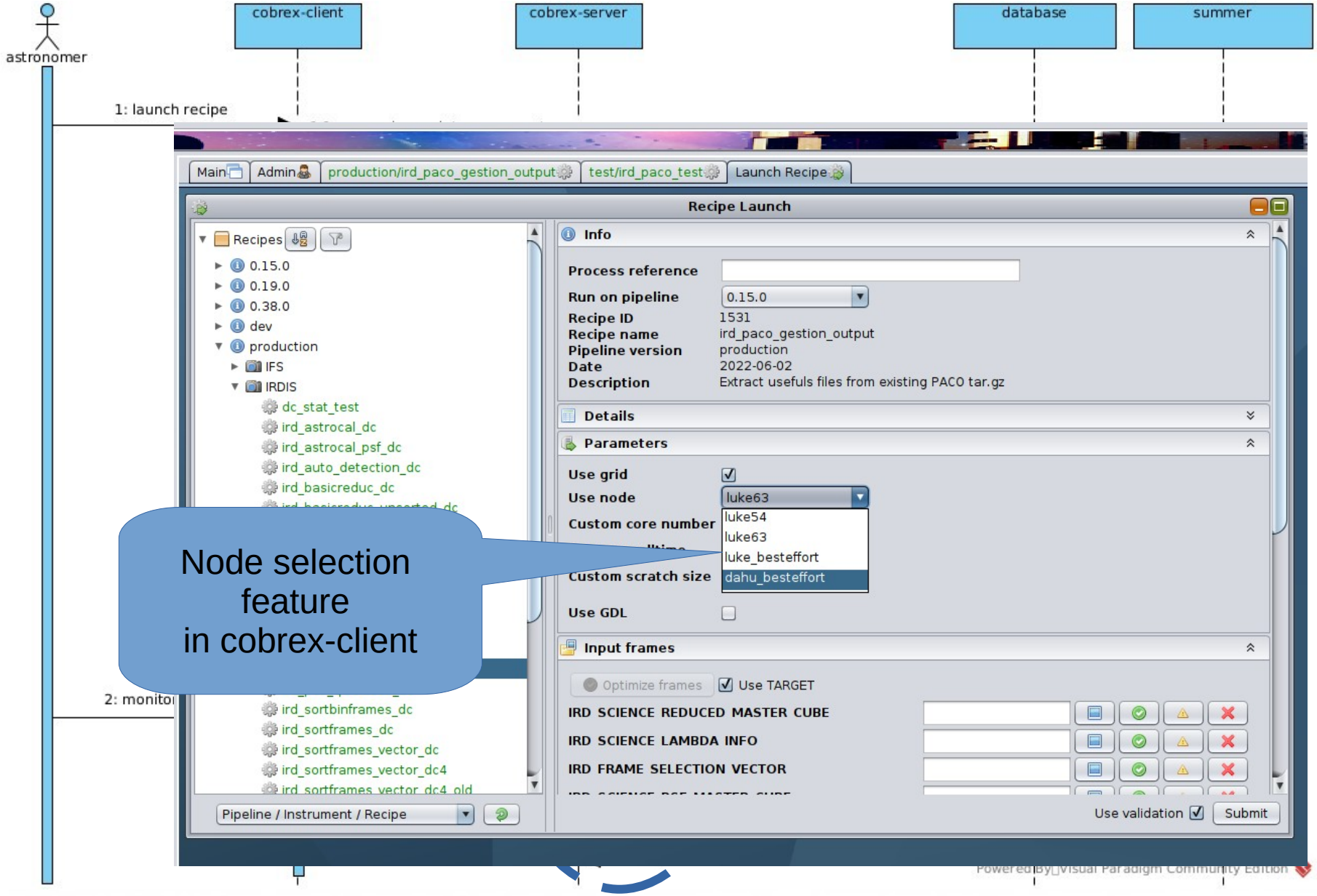
COBREX DC data

SW Architecture / launch recipe sequence



COBREX DC data

SW Architecture / launch recipe sequence



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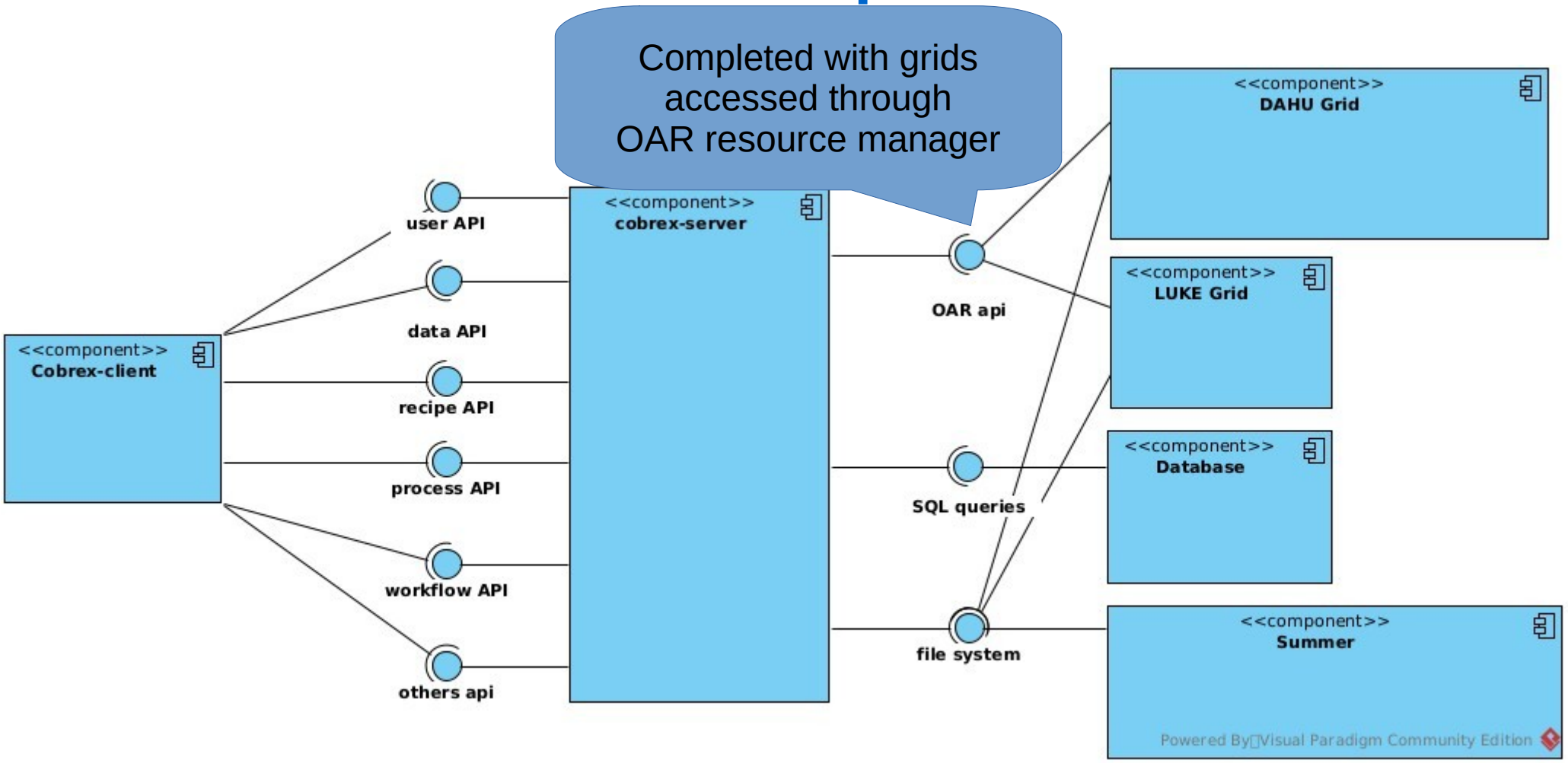
COBREX DC data

SW Architecture / complete



COBREX DC

Use cases

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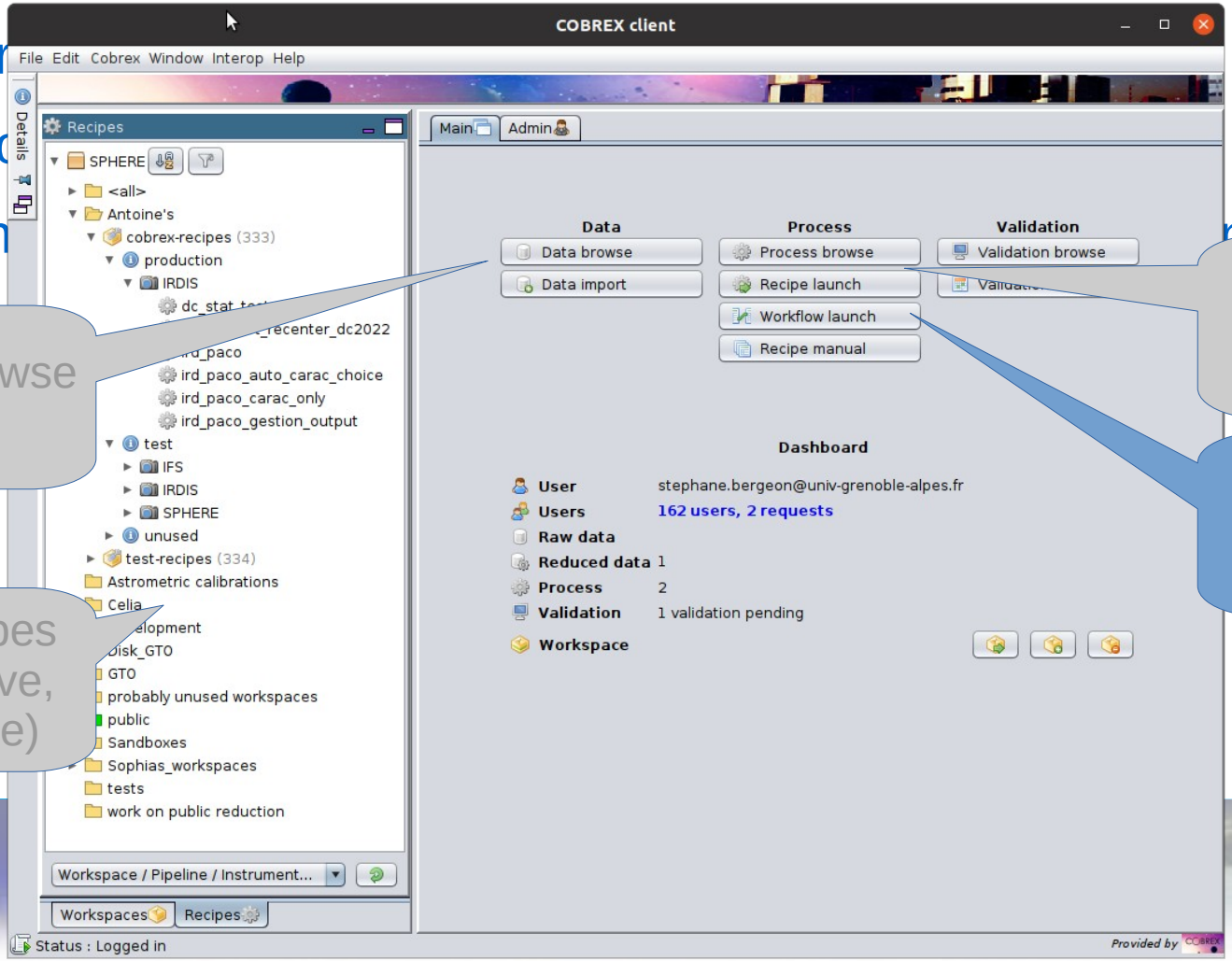

Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow

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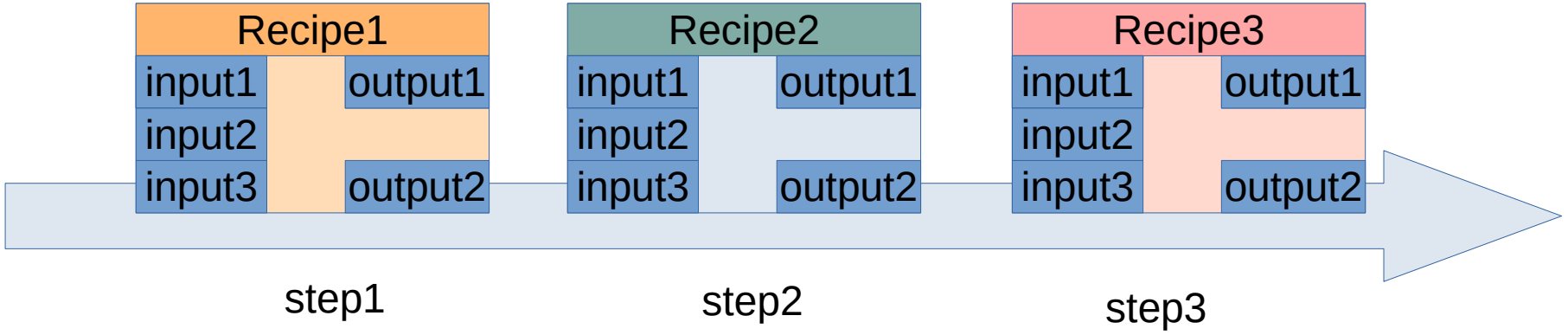
COBREX DC workflows

How to run workflows?

- **Workflow ?**

  A workflow is a suite of recipes (steps)



COBREX DC workflows

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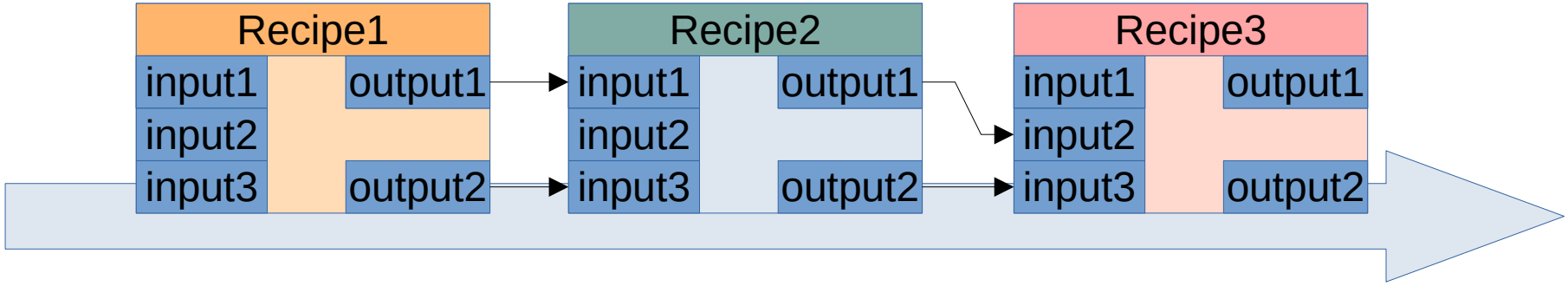

  - Outputs of a step can be inputs of next steps

COBREX DC workflows

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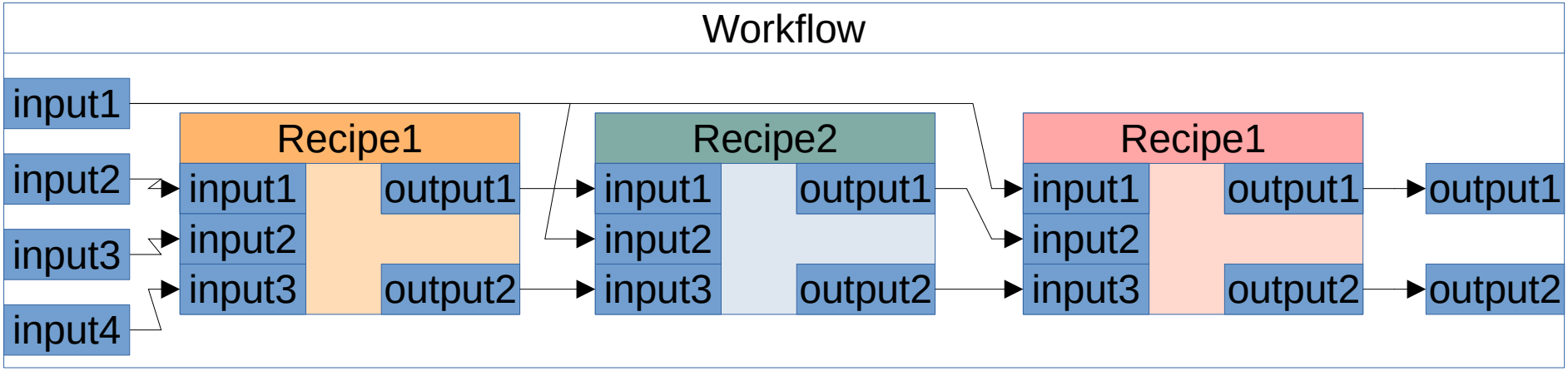

- Outputs of a step can be inputs of next steps
- The workflow gathers all inputs and ouputs

COBREX DC workflows

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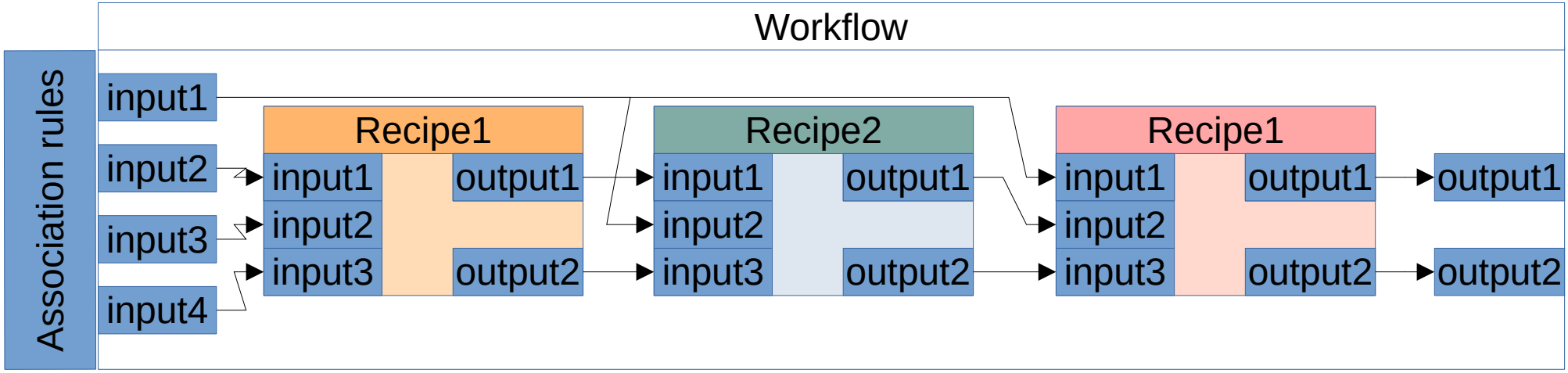

- Outputs of a step can be inputs of next steps
- The workflow gathers all inputs and ouputs and associates inputs with association rules

COBREX DC workflows

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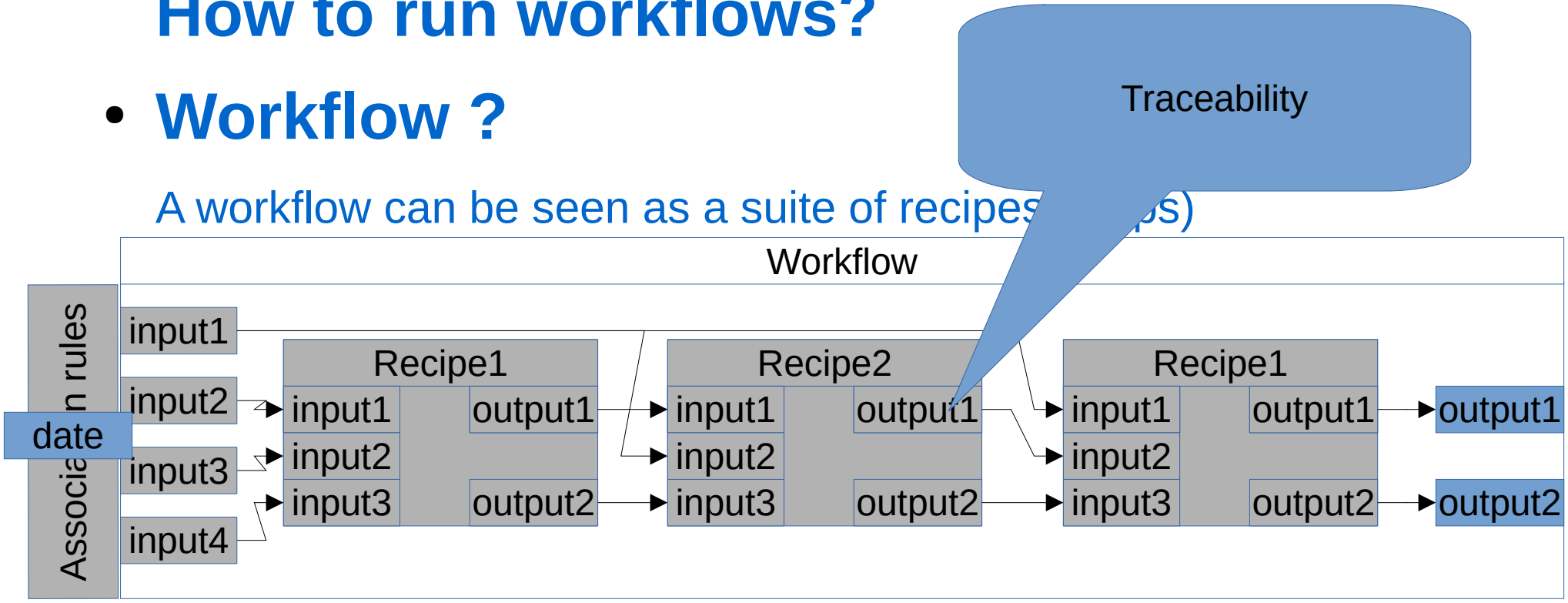

- Outputs of a step can be inputs of next steps
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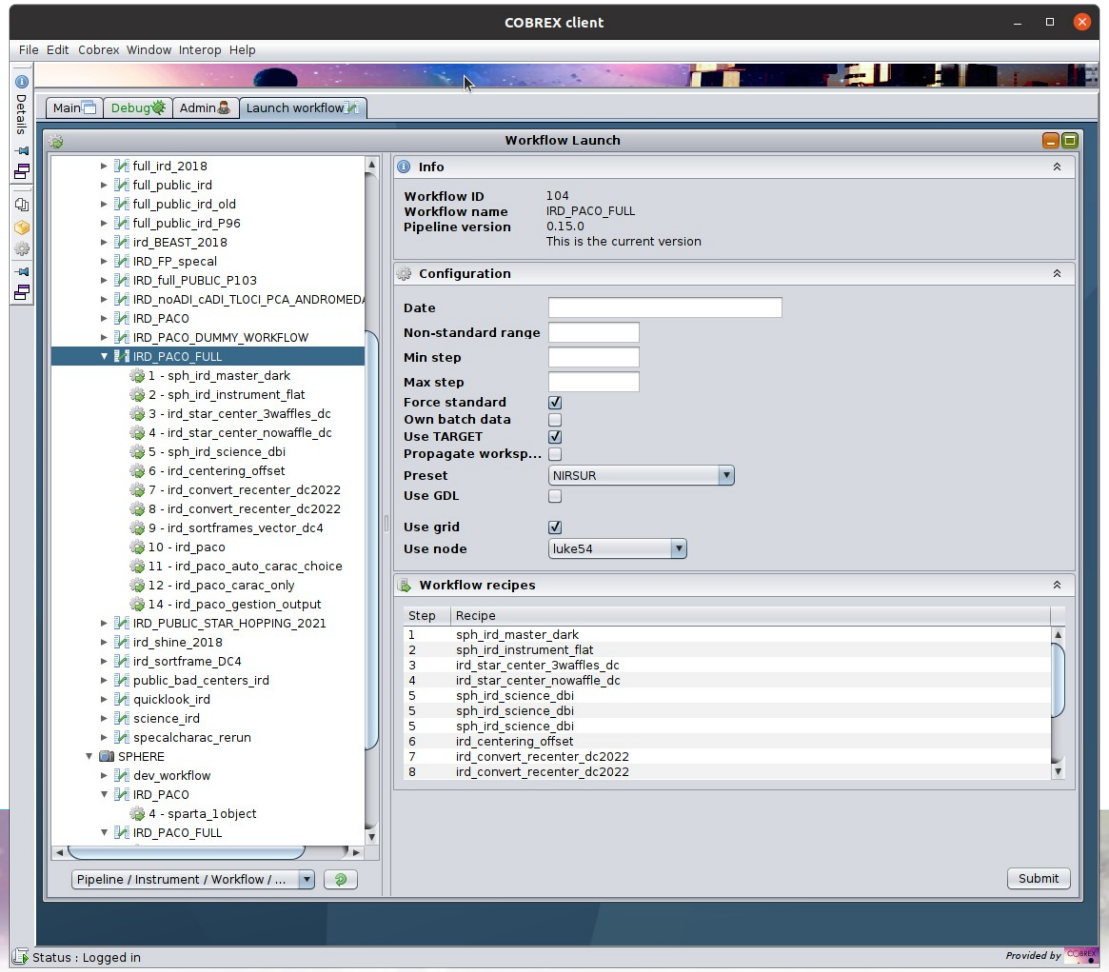
COBREX DC workflows

How to run workflows?

- Workflows can be created and run through the cobrex-client
  - “Launch workflow” feature in the cobrex-client…
    - Select the workflow
    - Select the date(s)



  - Workflow = powerful feature to automate reductions

COBREX worflows :

PACO (Antoine)
RDI (Sophia)

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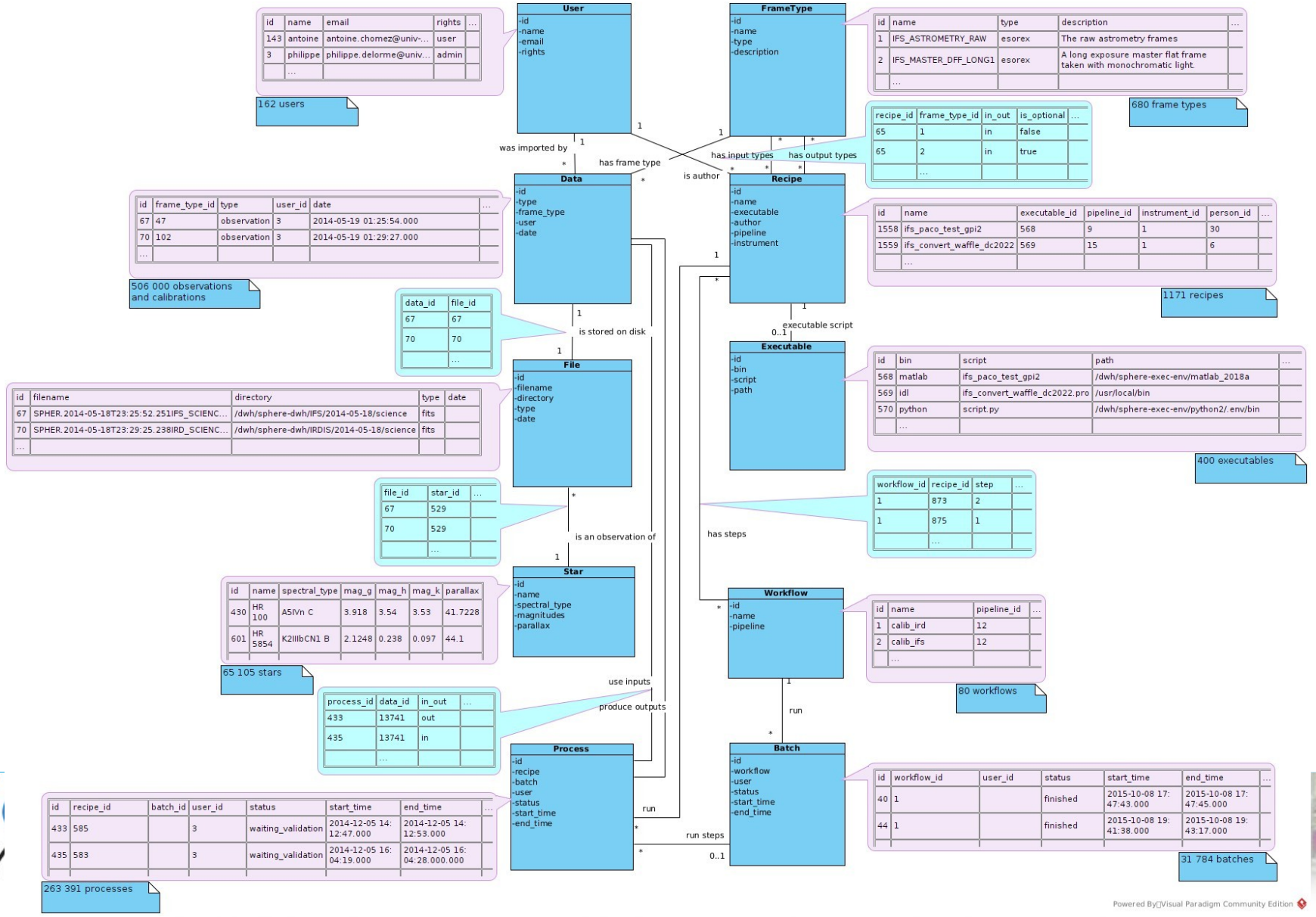
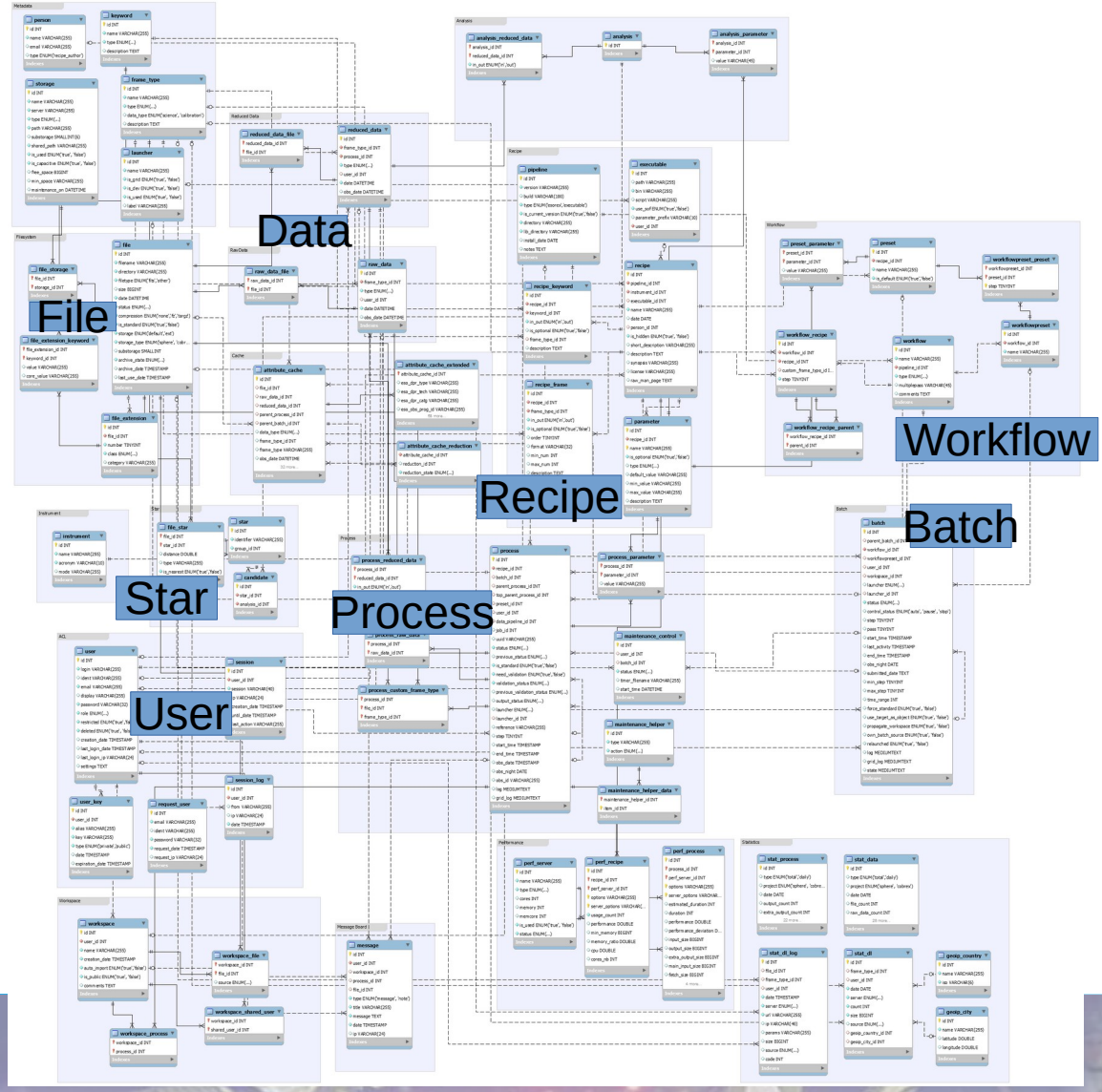
COBREX DC database model

Cobrex database main tables



COBREX DC database model

The global cobrex-dc database model



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COBREX DC status

Other features

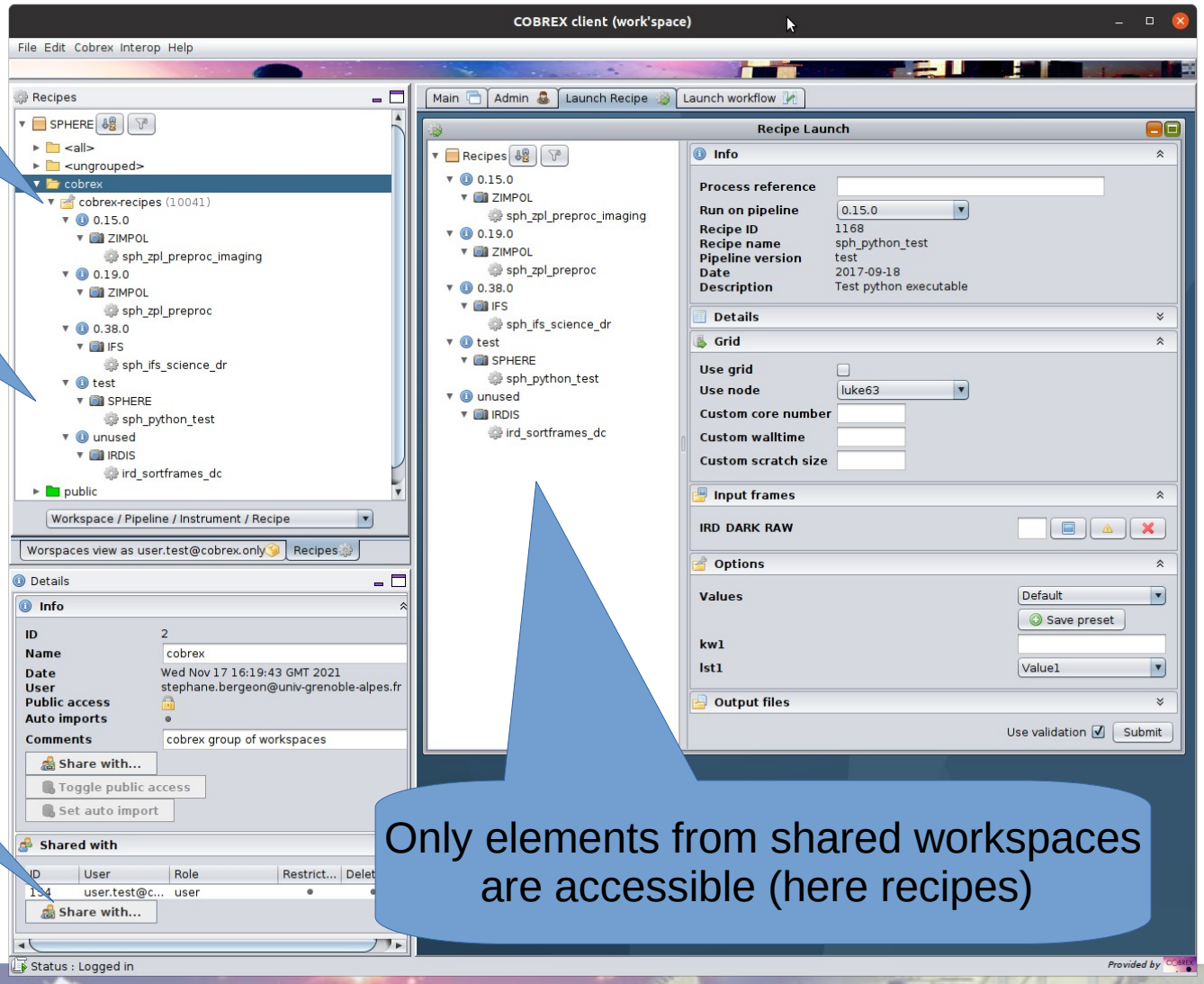
- Restrict / Share data and recipes among users - workspaces
- Track issues, request new features
- Monitor usages
- Documentation:
  - User Manual: https://sphere.osug.fr/sites/sphere.osug.fr/IMG/pdf/manuel_reduc_publique.pdf
  - Installation guide: http://cobrex-dc.osug.fr/cobrex-server/cobrex-client/docs/README.html

COBREX DC workspaces

Data, processes and recipes are organized by workspaces

Groups contains workspaces

Workspaces and groups can be shared to user



Only elements from shared workspaces are accessible (here recipes)

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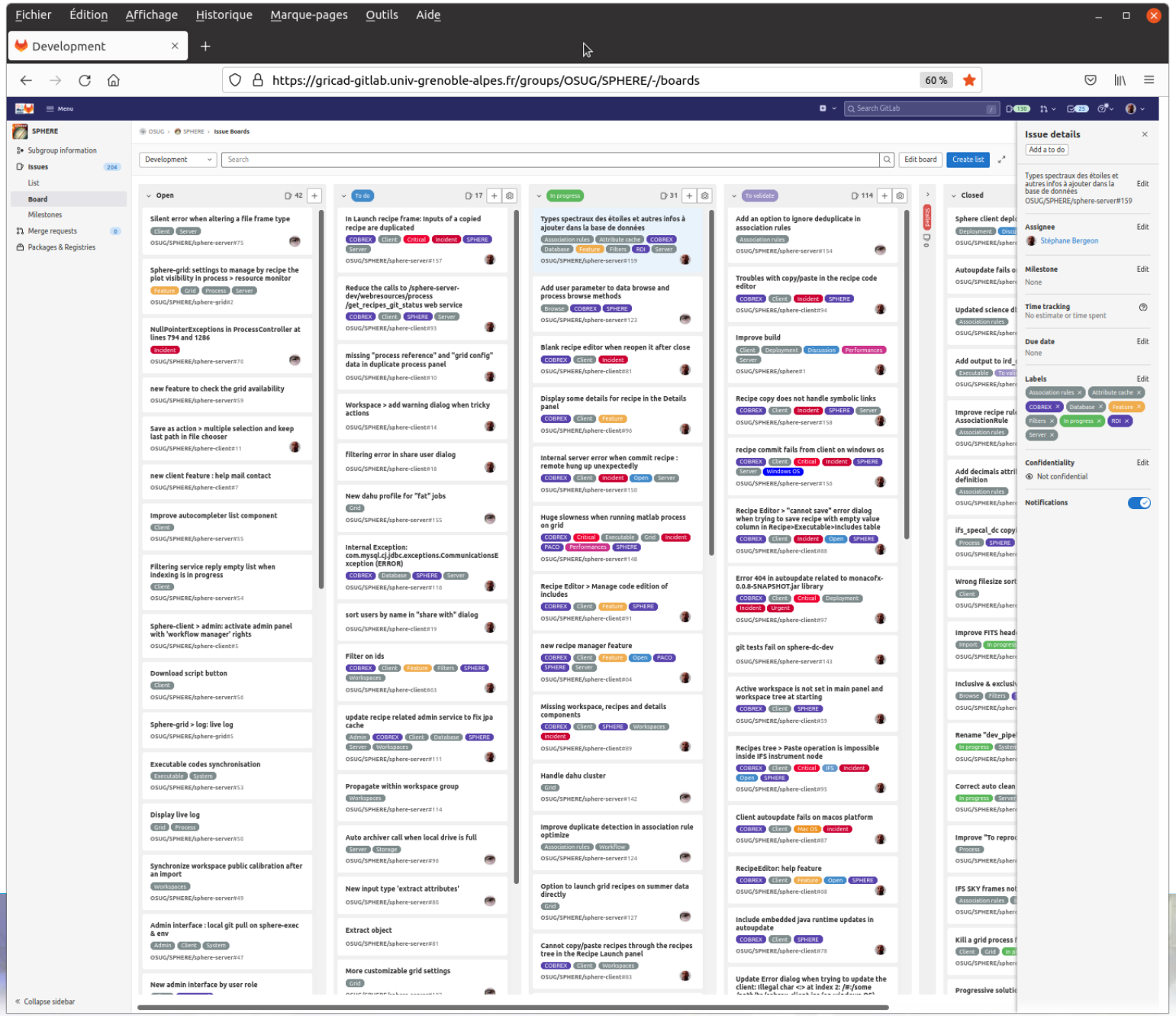
COBREX DC issue tracker



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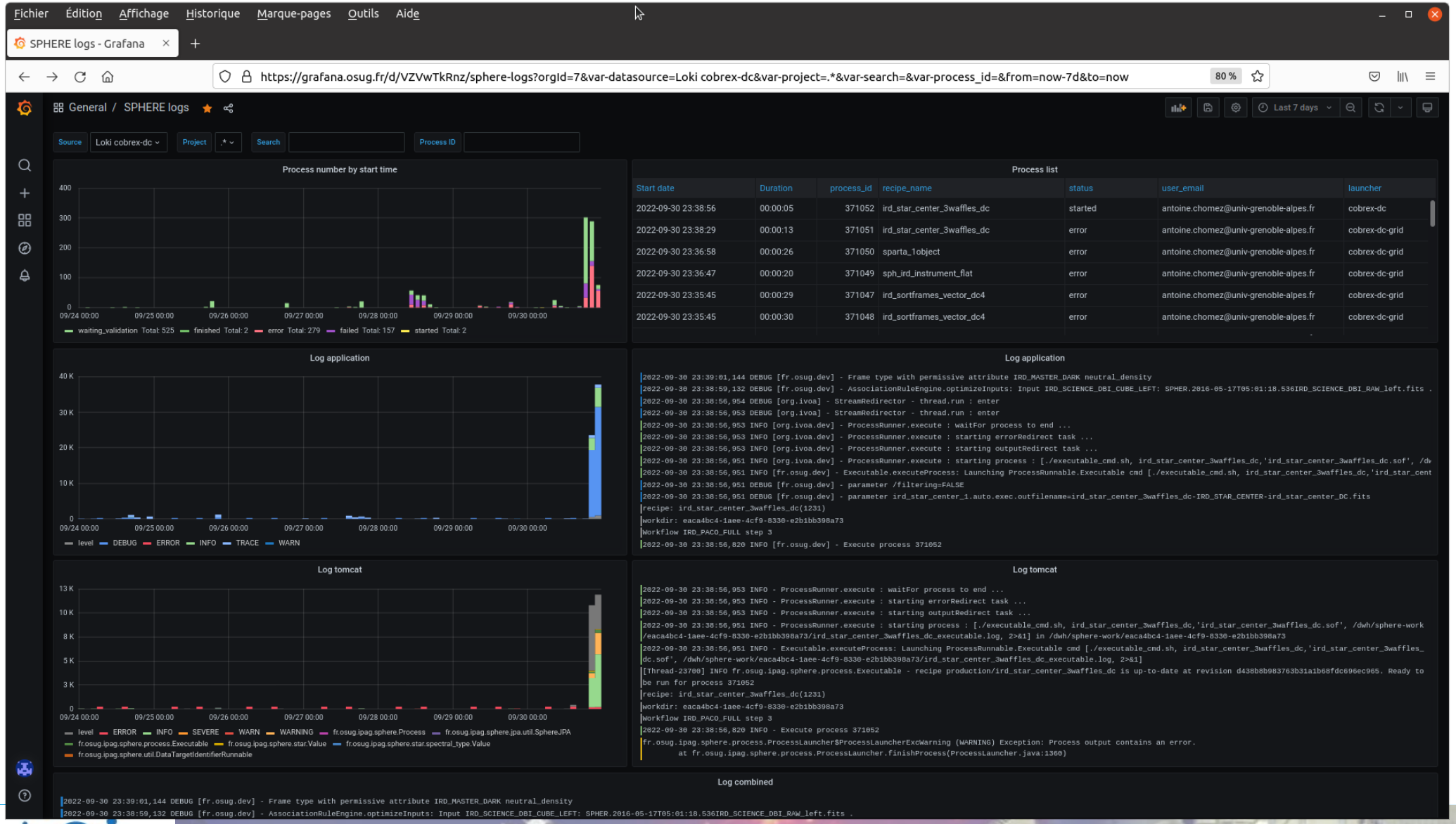
COBREX DC monitoring



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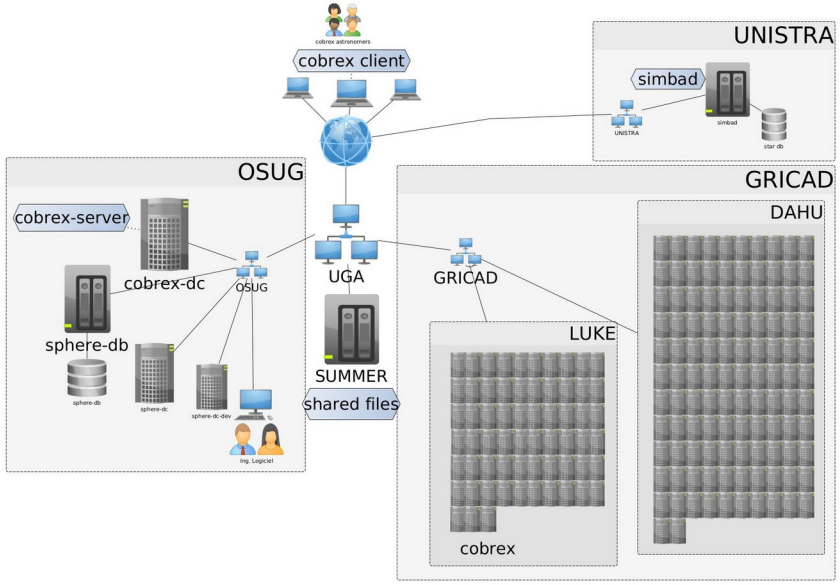
COBREX DC status

Many features not presented...

- **Recipe git**
  (recipes are shared among servers and grid using git versioning system)
- **Presets**
  (set of parameters, used when running recipes and workflows)
- **Input optimization**
  (a feature to find automatically inputs once main one has been set)
- **...**

COBREX DC status

Conclusion



- Cobrex-dc provides SW and HW architecture to fulfill the objective of massive automatic reductions

The next presentation will talk about reductions done up to now with cobrex-dc...