



COBREX



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

The screenshot shows the COBREX server web application interface. It includes a navigation menu at the top with options like 'Echier', 'Edition', 'Affichage', 'Historique', 'Marque-pages', 'Outils', and 'Aide'. The main content area is titled 'COBREX server web Application' and contains the following sections:

- COBREX server is running...** version is 1.0-SNAPSHOT
- COBREX client distributions**

platform	filename	extension	version
linux	cobrex-client	tar.gz	1.0
windows	cobrex-client	zip	1.0
mac	cobrex-client	tar.gz	1.0
any	*	*	1.0

- COBREX client installation guide**
  - [Installation guide english version](#)
  - [Guide d'installation en français](#)
- COBREX client tutos**
  - [How to share/unshare a workspace](#)
  - [Comment partager un workspace](#)

The screenshot shows the COBREX client login panel. It features a 'Login' button and a 'Remember me' checkbox. A 'User creation request' dialog box is open, displaying the following text:

**User creation request**

The public data is available by using login 'public\_user@sphere' and password 'public\_user'.

If you should have access to the SPHERE client, you have to request a user creation to an administrator.

Would you fill the user creation form now?

Buttons: Cancel, No, Yes

The screenshot shows the COBREX client registration form. It includes the following fields and buttons:

- Email
- Identifiant
- Password
- Re-type Password
- Request button

Status: Provided by COBREX

# 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

- Store
- Upload
- Run

The screenshot shows the COBREX client interface. On the left, a file tree under 'Recipes' shows a hierarchy: SPHERE > Antoine's > cobrex-recipes (333) > production > IRDIS > dc\_stat\_test. The main area is divided into three columns: Data (Data browse, Data import), Process (Process browse, Recipe launch, Workflow launch, Recipe manual), and Validation (Validation browse, Validation). Below these is a 'Dashboard' section with the following data:

Category	Value
User	stephane.bergeon@univ-grenoble-alpes.fr
Users	162 users, 2 requests
Raw data	
Reduced data 1	
Process	2
Validation	1 validation pending
Workspace	

At the bottom, there are buttons for 'Workspaces' and 'Recipes', and a status bar indicating 'Status : Logged in'.

Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow

# COBREX DC

## Use cases

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



# COBREX DC

## Use cases

- Manage Data
- Manage Recipes
- Manage Processes
- Manage Workflows
- Software architecture
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# COBREX DC use cases

## How to use COBREX-DC ?

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Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow

# COBREX DC data

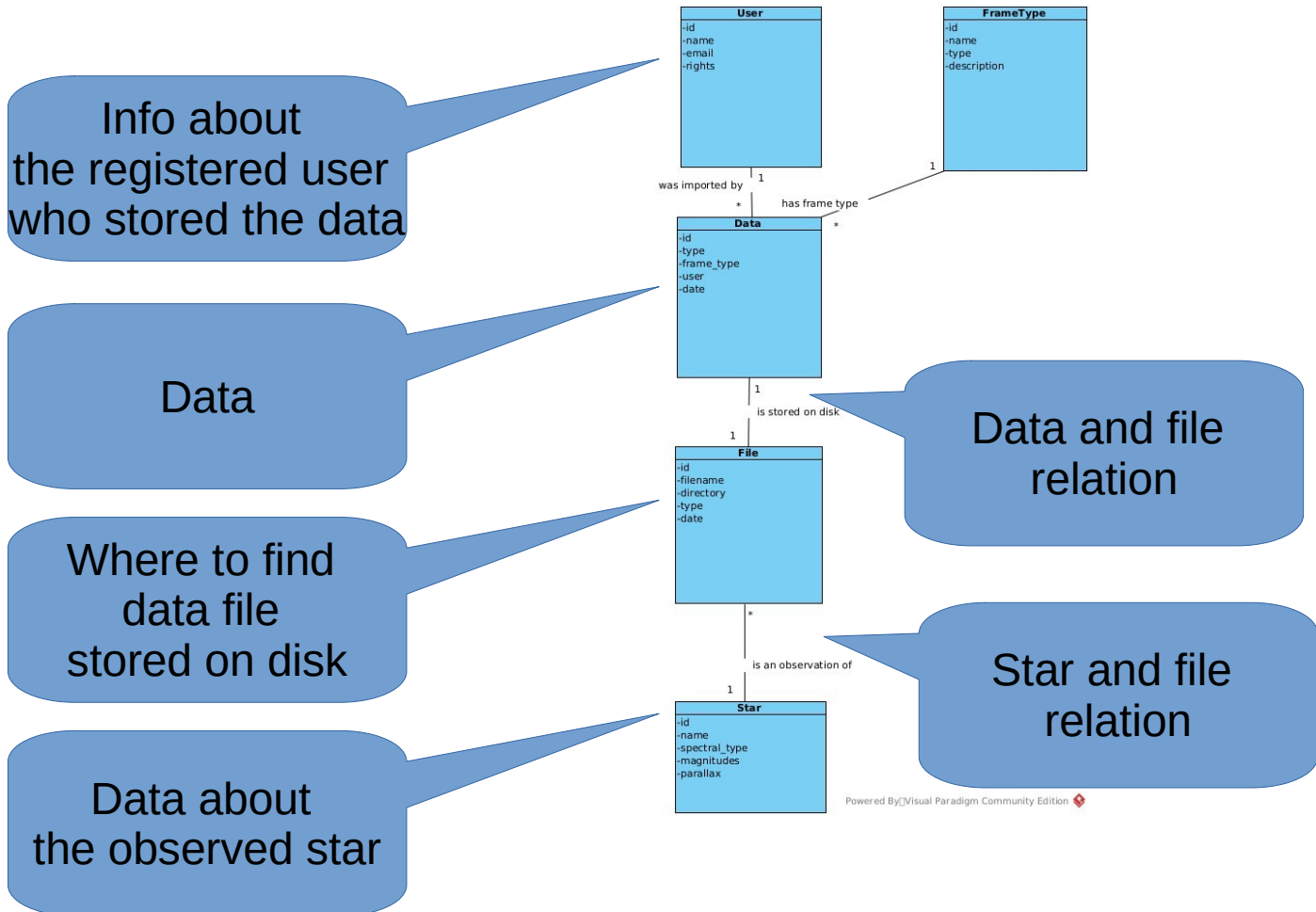
## How data is stored and how retrieve data ?

- 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 (coronagraphy, filter...)



# COBREX DC data

## How data is stored and how retrieve data ?



Database model

data model (simplified)

5 main tables:

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



# 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

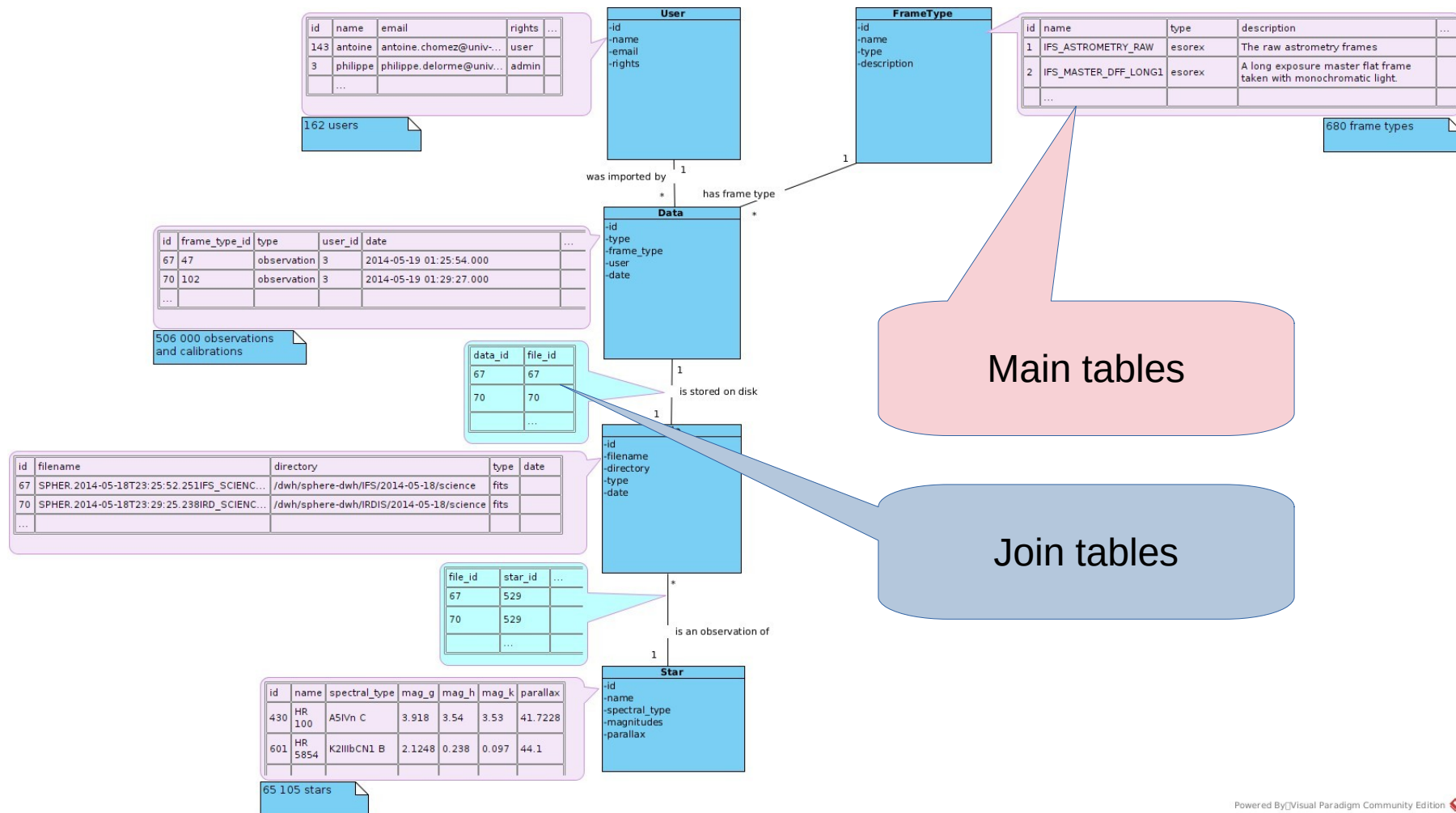
The screenshot shows the COBREX client interface. The main window is titled "Data Browse (236)" and displays a table of data records. The table has columns for ID, File name, Size, Frame, Obs. date, RA, DEC, Filter, Exp. ti..., Prog. ID, Ext..., Type, Ra..., Sta..., and Sta... The table contains several rows of data, with the row for ID 4235... selected. To the left of the table is a filter panel with various dropdown menus and input fields for filtering data by user, workspace, group, data type, raw/reduced, frame type, date, data ID, standard, reduction state, observation, file, and process. Below the filter panel are "Submit" and "Clear" buttons. To the right of the table is a detailed view of the selected file, showing its metadata and FITS key words. The detailed view includes fields for File ID, Raw data ID, Filename, File size, Directory, File creation date, Archive, Data type, Raw/reduced, Observation night, Observation date, Observation ID, Frame type, FITS extensions, Processed, Status, Reduction state, and User. It also lists specific FITS key words and their values.

List of  
filtered data

Details of  
the selected data  
among the list

# COBREX DC data

## How data is stored and how retrieve data ?



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



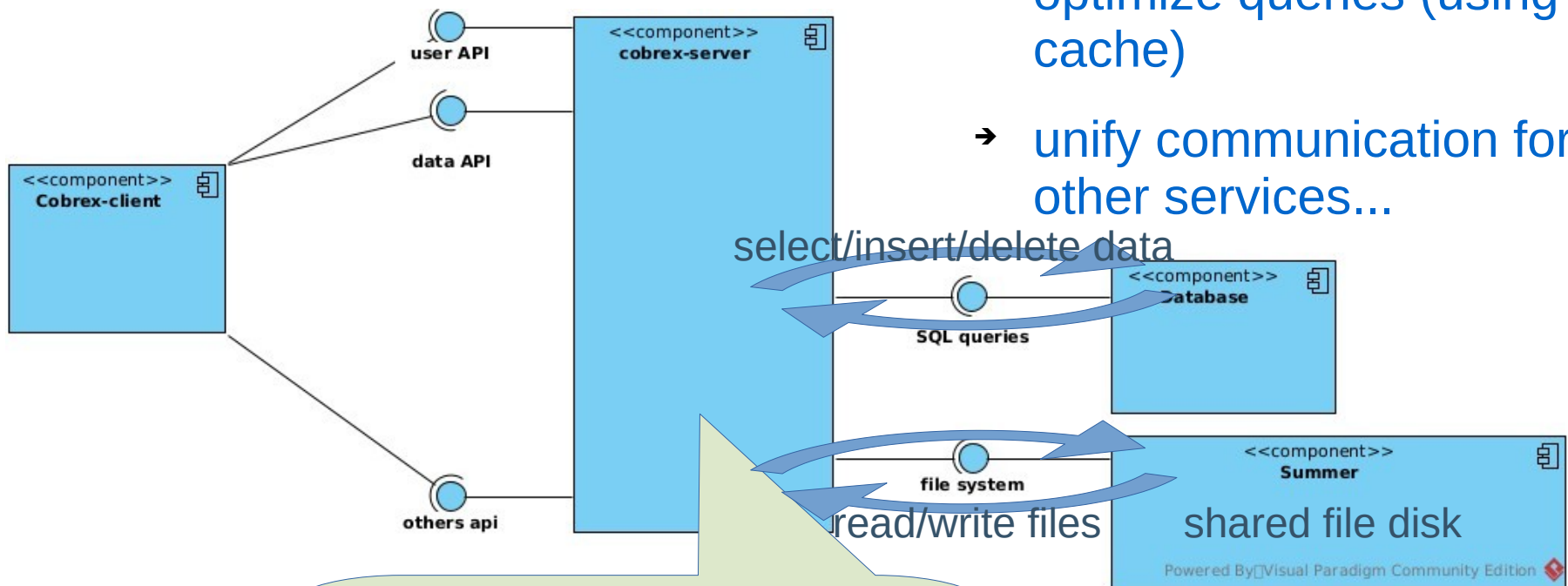
Your cobrex-client  
does not query  
the database in direct line

# COBREX DC data

## SW Architecture / data management

- **Client-server architecture**

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

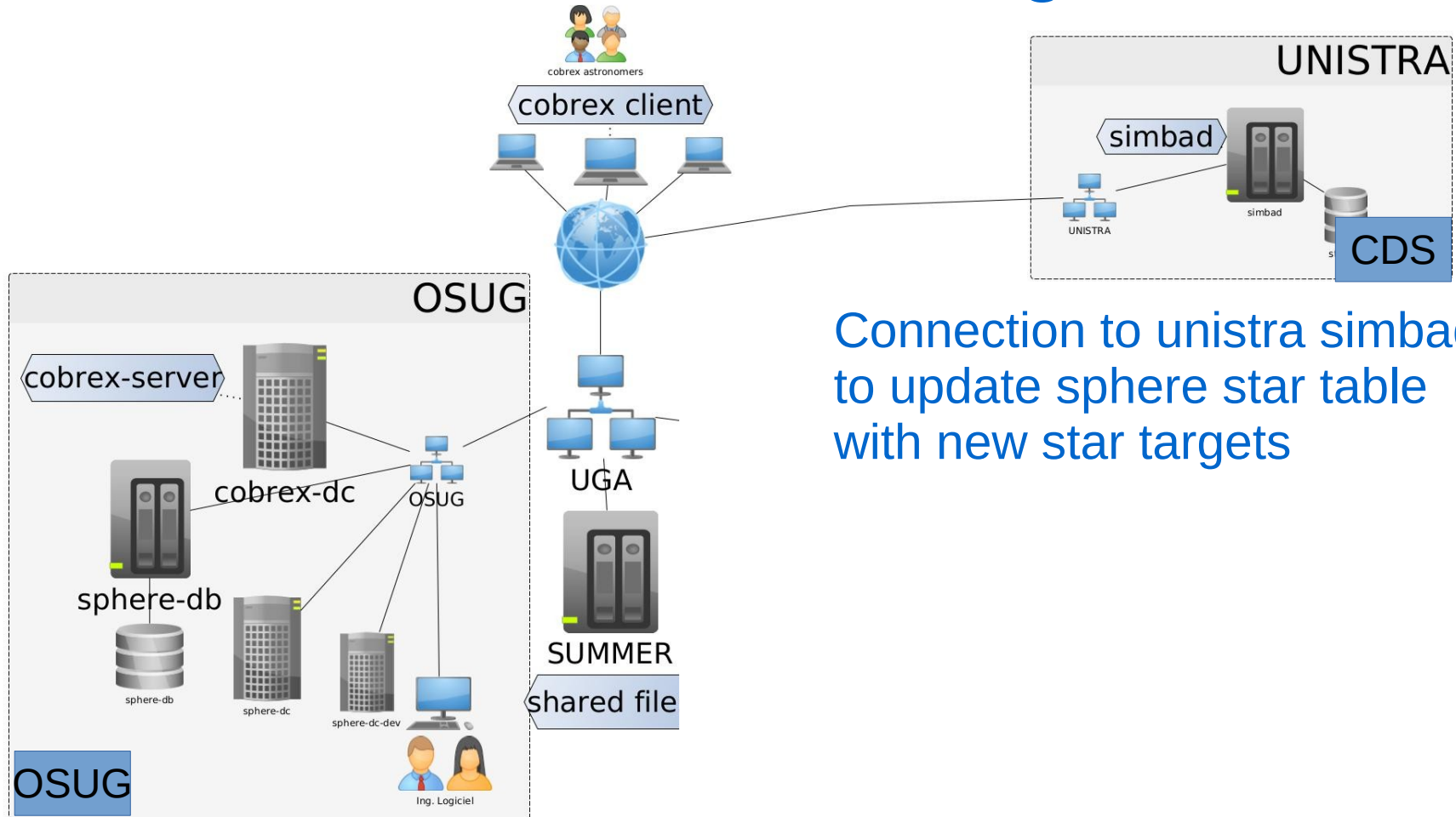


Cobrex-server provides dedicated api front-end web-service (REST) and runs sql queries + files IO in back-end



# COBREX DC data

## HW Architecture / data management



# COBREX DC

## Use cases

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

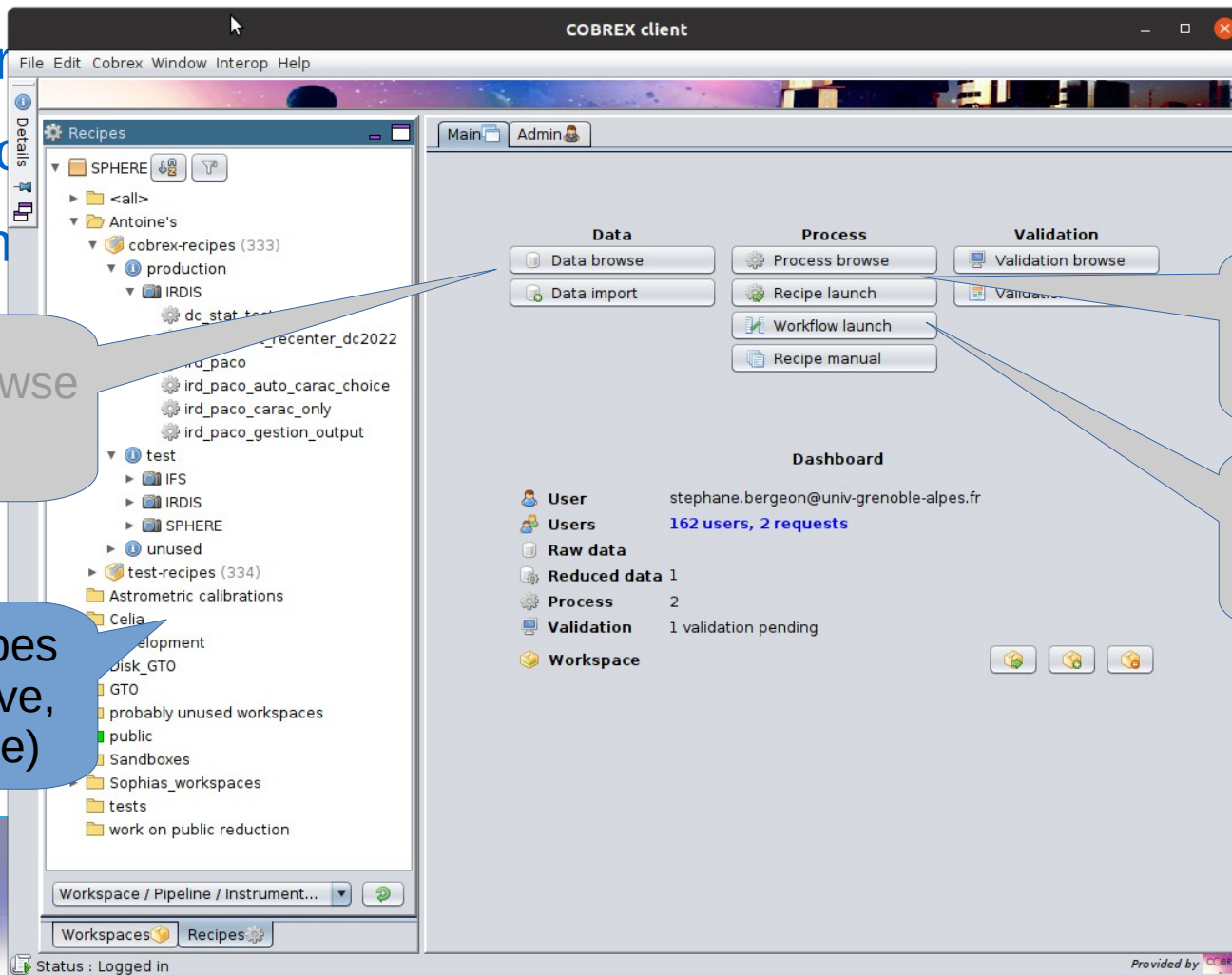


# COBREX DC use cases

## How to use COBREX-DC ?

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

- Store
- Upload
- Run



Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

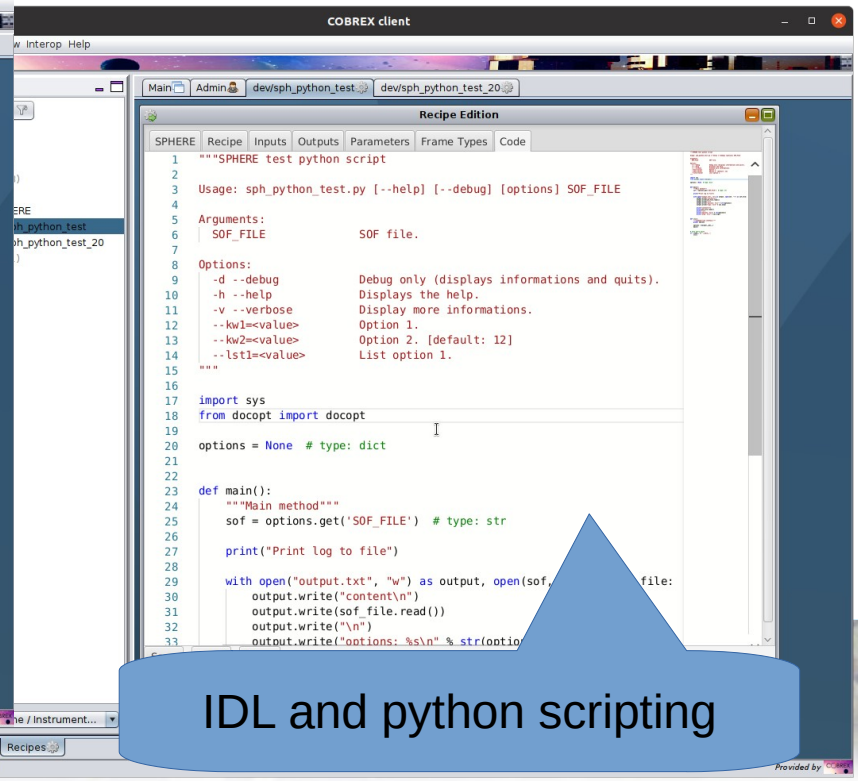
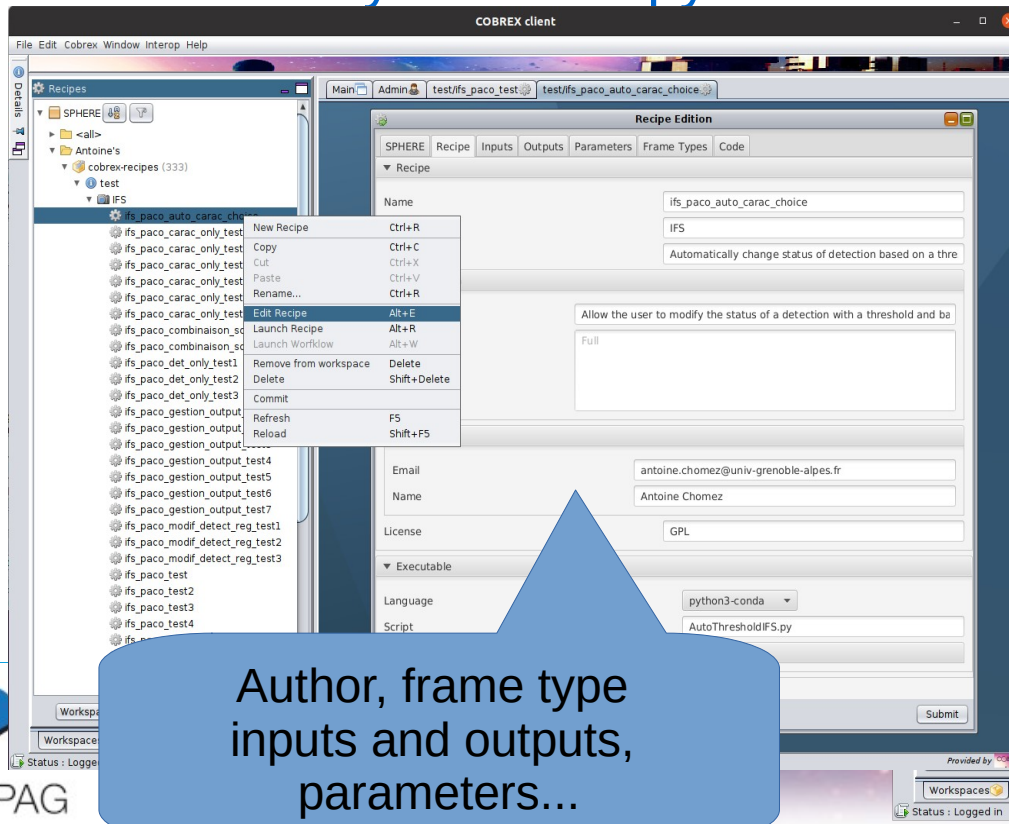
Run workflow



# COBREX DC recipes

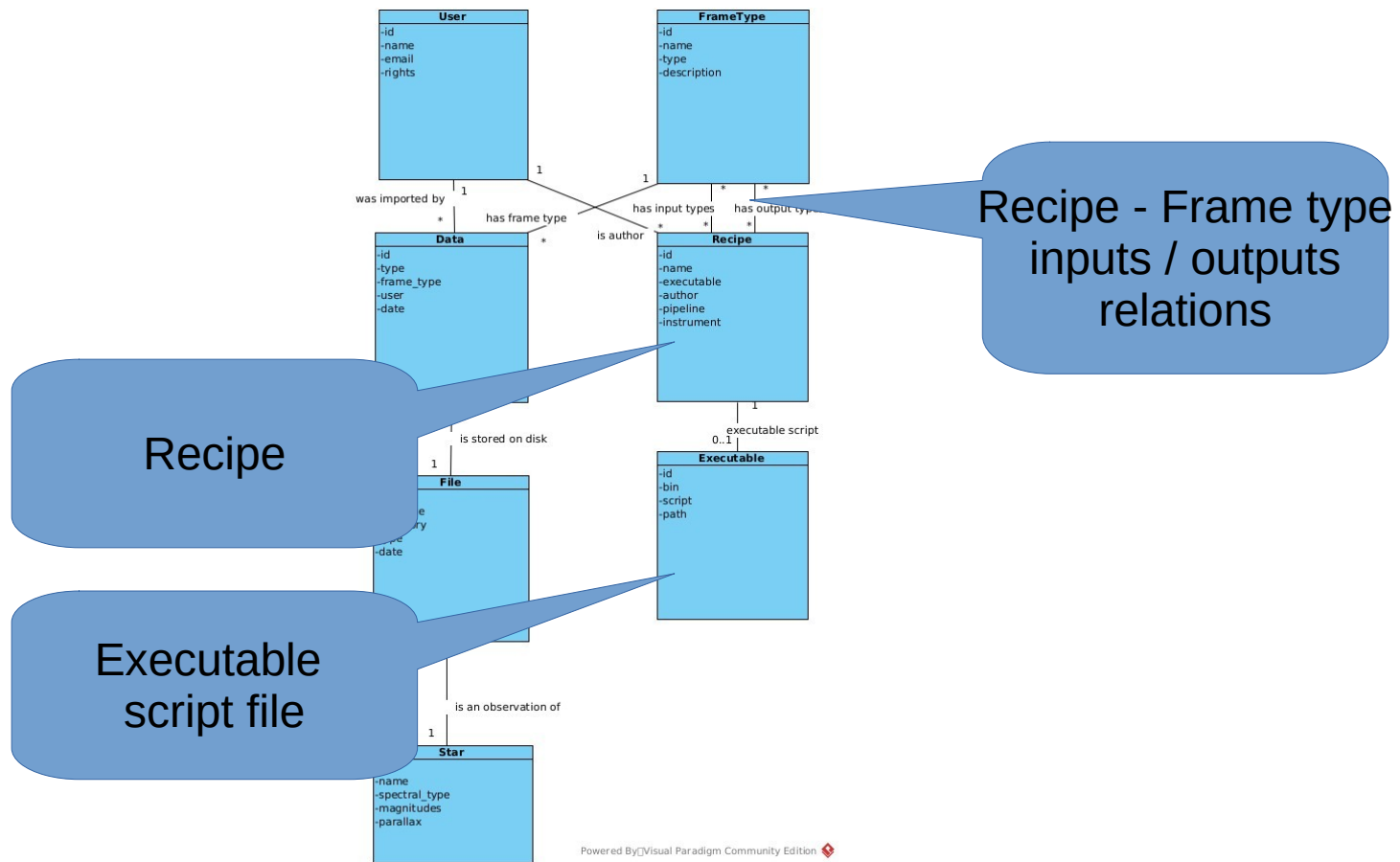
## How import recipe ?

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



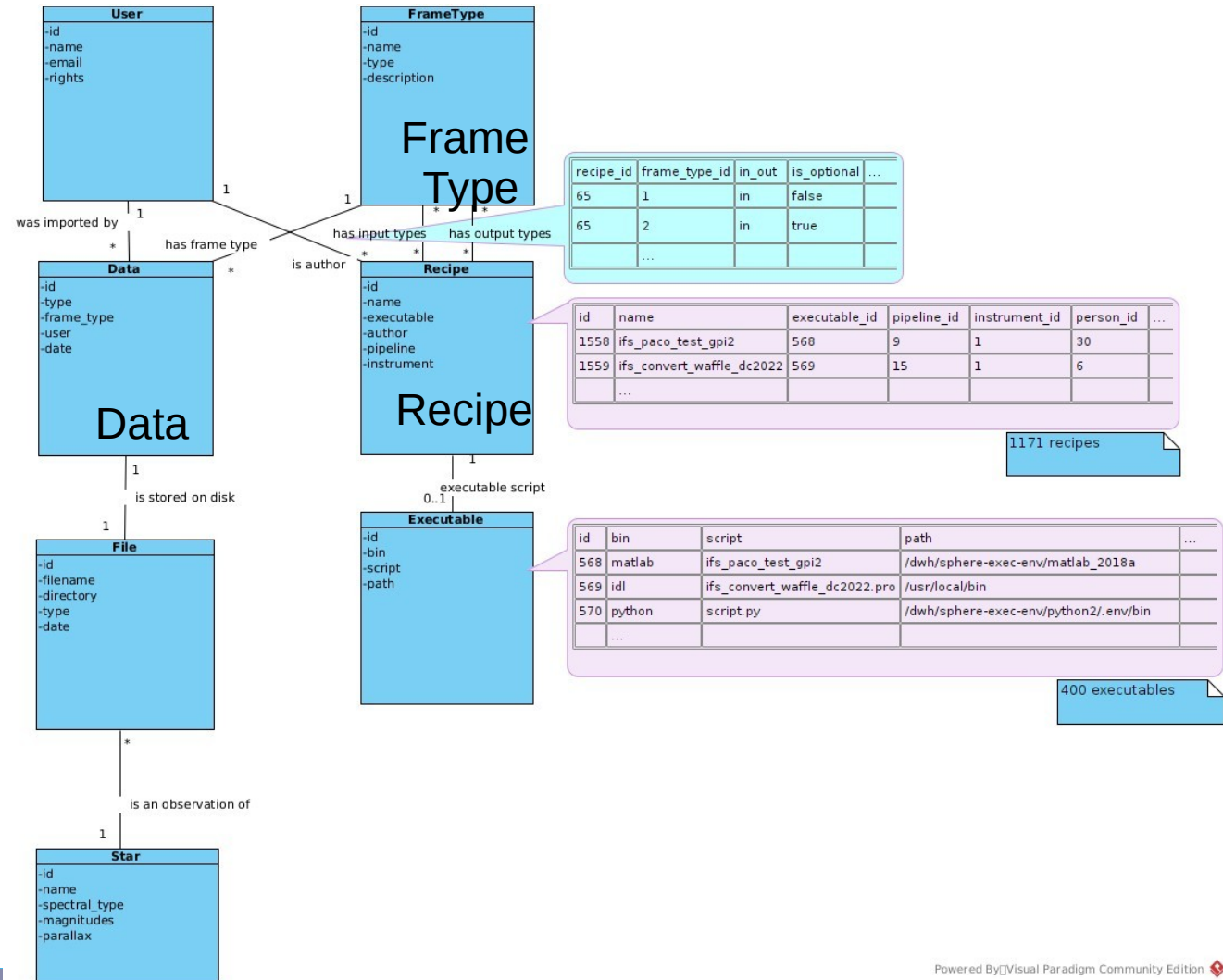
# COBREX DC data

## Recipes are stored in database



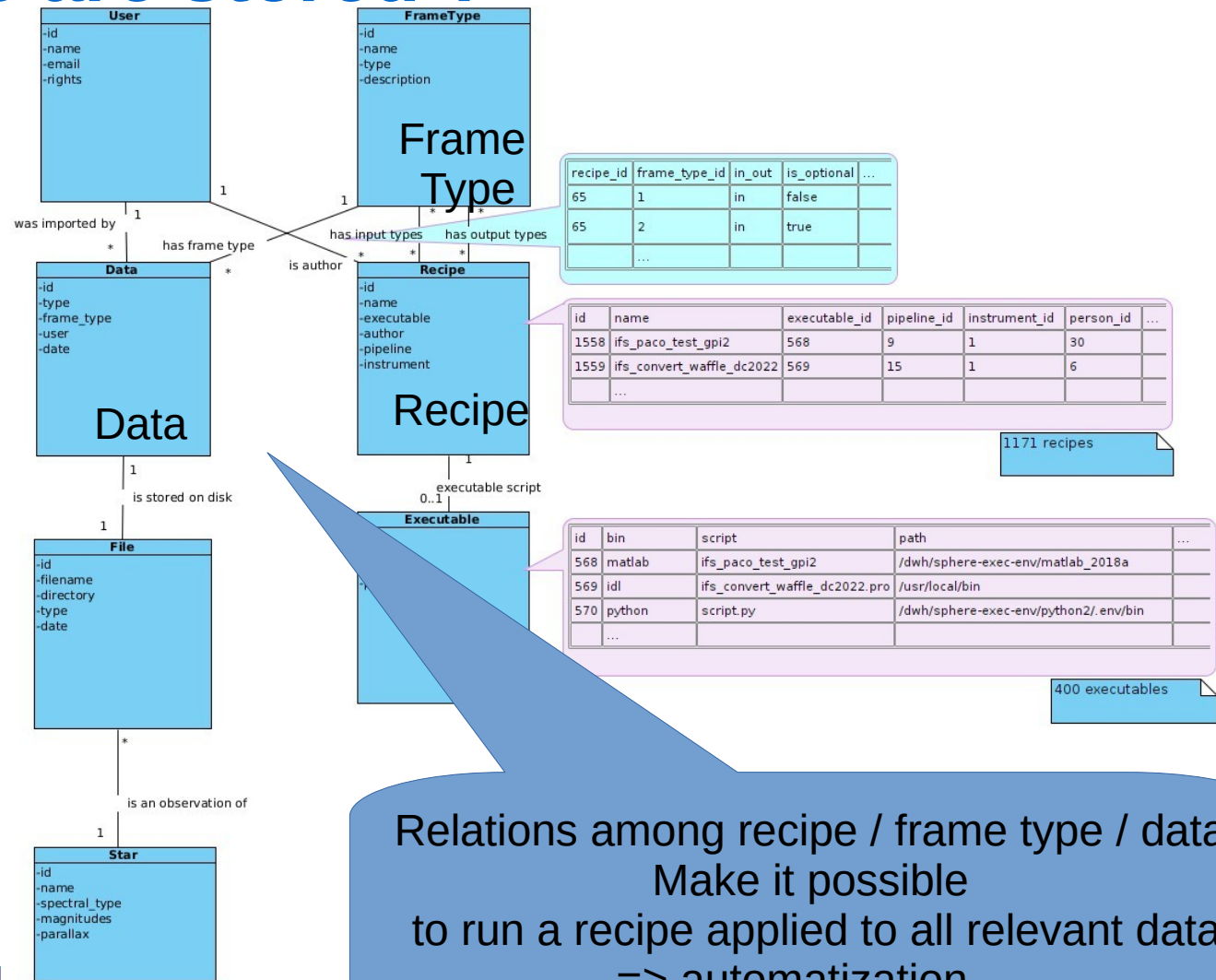
# COBREX DC recipes

## How recipes are stored ?



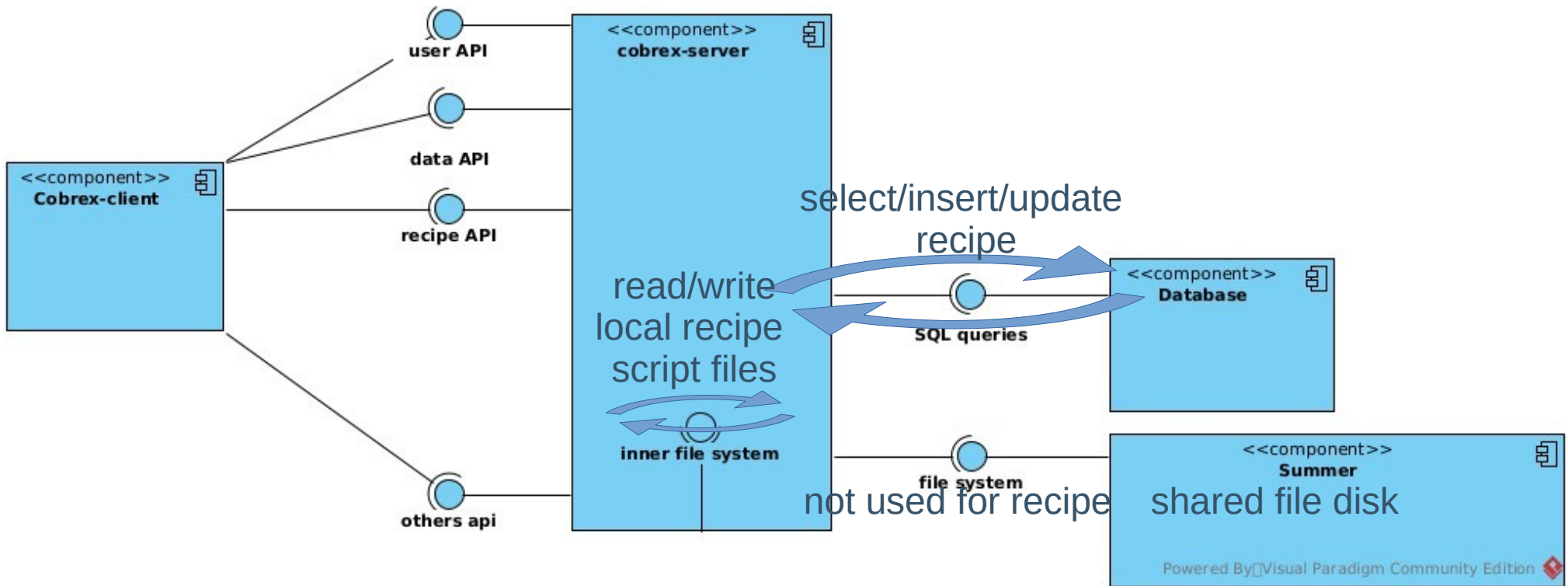
# COBREX DC recipes

## How recipes are stored ?



# 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

## How to use COBREX-DC ?

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

- Store
- Upload
- Run

The screenshot shows the COBREX client interface. On the left, there is a 'Recipes' tree view with folders like 'SPHERE', 'Antoine's', 'production', 'test', and 'test-recipes'. The main area is divided into three columns: 'Data' (with 'Data browse' and 'Data import' buttons), 'Process' (with 'Process browse', 'Recipe launch', 'Workflow launch', and 'Recipe manual' buttons), and 'Validation' (with 'Validation browse' and 'Validation' buttons). Below these is a 'Dashboard' section showing user information (stephane.bergeon@univ-grenoble-alpes.fr), 162 users, 2 requests, 1 reduced data item, 2 processes, and 1 pending validation. At the bottom, there are workspace and recipe management buttons.

Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow



# 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

The screenshot shows the COBREX client interface. The main window is titled "COBREX client" and has a menu bar with "File", "Edit", "Cobrex", "Window", "Interop", and "Help". The "Launch Recipe" button is visible in the top navigation bar. The "Recipe Launch" dialog is open, showing a tree view of recipes on the left. The selected recipe is "ird\_paco". The right pane shows the "Info" tab with the following details:

- Process reference: [text box]
- Run on pipeline: 0.15.0
- Recipe ID: 1530
- Recipe name: ird\_paco
- Pipeline version: production
- Date: 2022-06-02
- Description: Apply PACO pipeline and produce final reduced images for IRDIS data

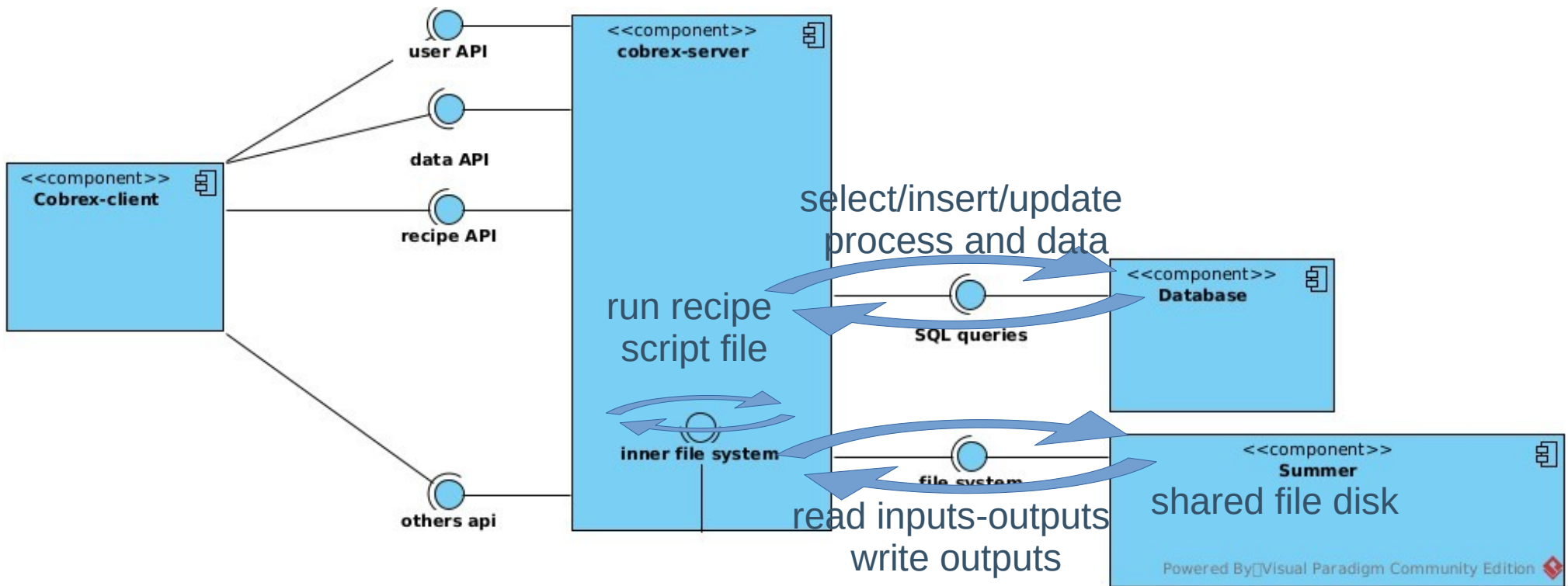
The "Input frames" section contains a table with the following data:

Input frame name	Value	Status
IRD SCIENCE REDUCED MASTER CUBE	3417475	OK
IRD SCIENCE PSF MASTER CUBE	3417478	OK
IRD SCIENCE PARA ROTATION CUBE	3417477	OK
IRD SCIENCE LAMBDA INFO	3417476	OK
IRD FRAME SELECTION VECTOR	1886689,3594234	OK
IRD WWM SNR ADDITIONAL SPECTRUM		OK
IRD HID FAKE FPS XCOORDS		OK
IRD HID FAKE FPS YCOORDS		OK
IRD HID FAKE FPS ALPHA		OK
IRD FOV MASK		OK

The "Options" section at the bottom has a "Values" dropdown set to "Default", a "Save preset" button, and dropdown menus for "reduction" (set to "perform"), "detection" (set to "perform"), "characterization" (set to "perform"), and "report" (set to "don't perform"). There are also checkboxes for "Use validation" and "Submit".

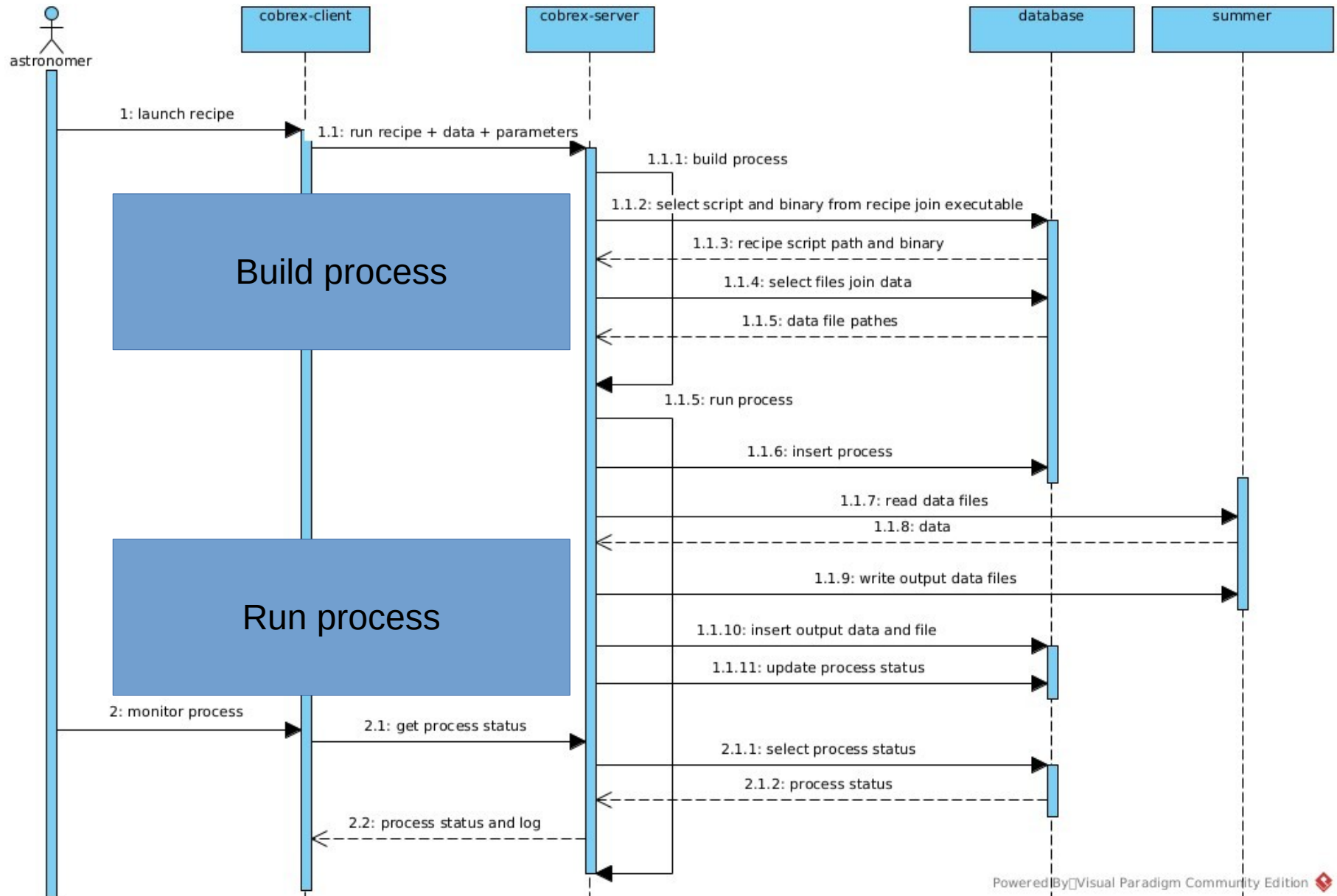
# COBREX DC data

## SW Architecture / launch recipe



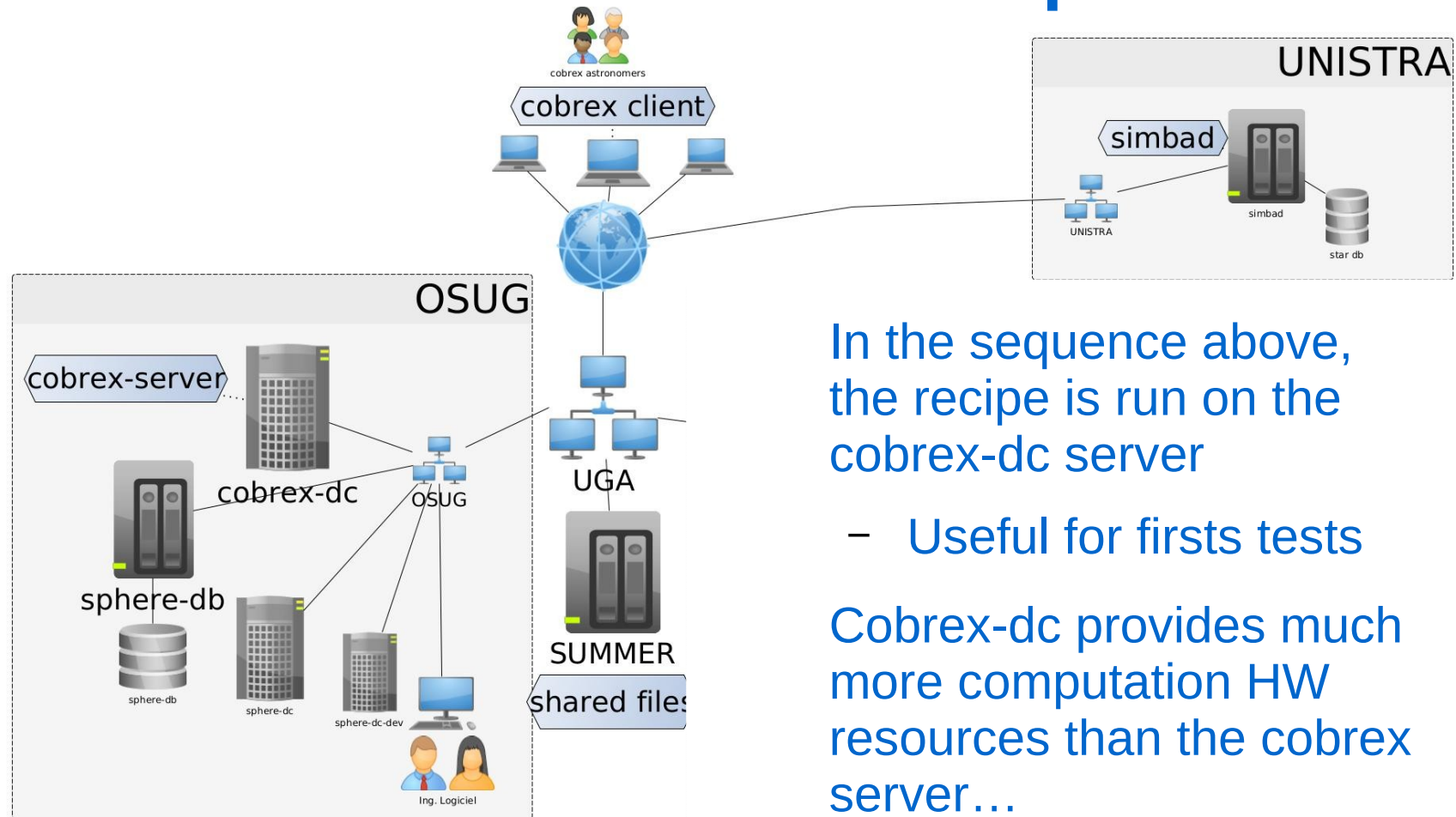
# COBREX DC data

## SW Architecture / launch recipe sequence



# COBREX DC data

## HW Architecture / launch recipe



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

- Useful for firsts tests

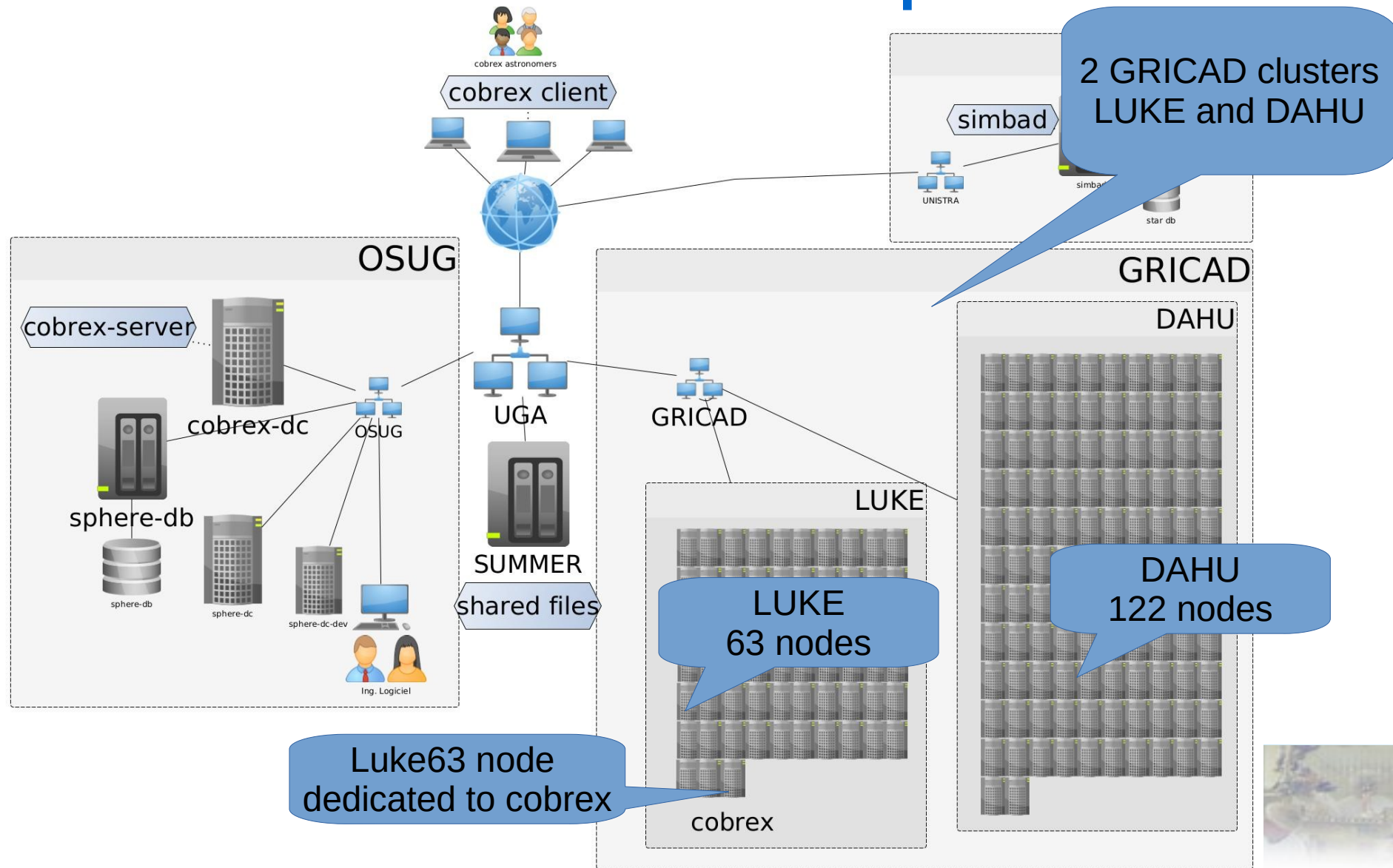
Cobrex-dc provides much  
more computation HW  
resources than the cobrex  
server...

- Key point to achieve  
massive automated  
reductions !



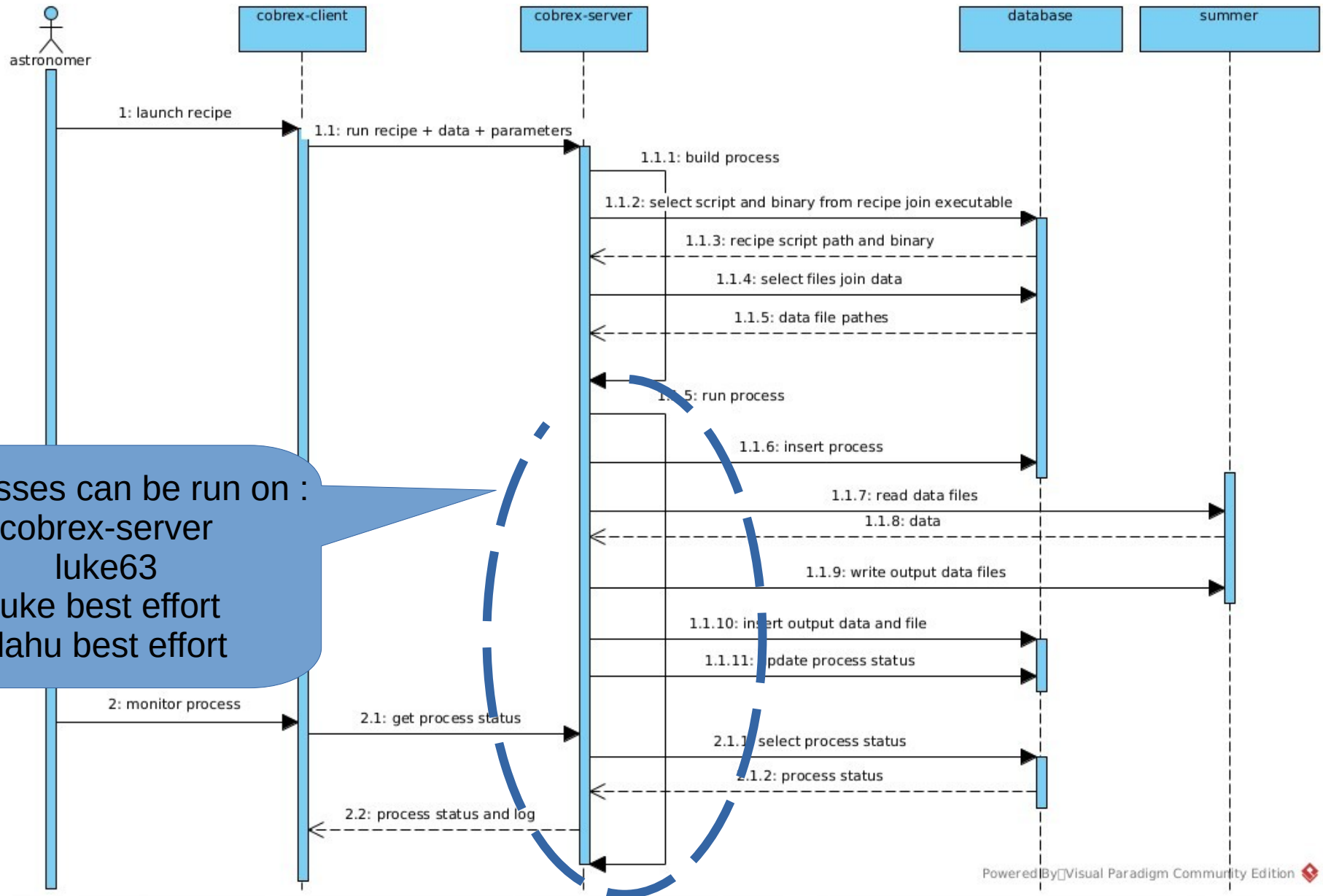
# COBREX DC data

## HW Architecture / launch recipe



# COBREX DC data

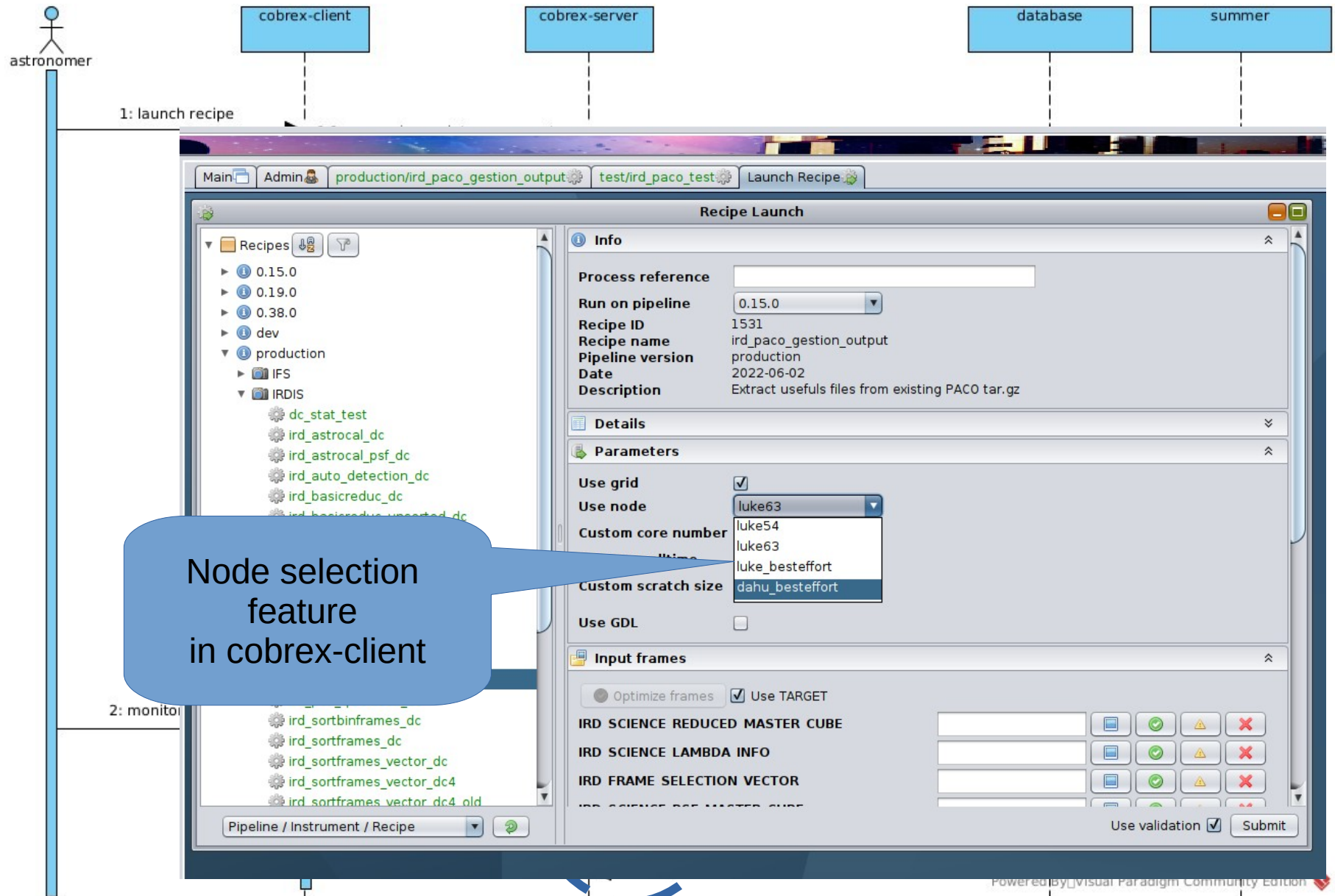
## SW Architecture / launch recipe sequence





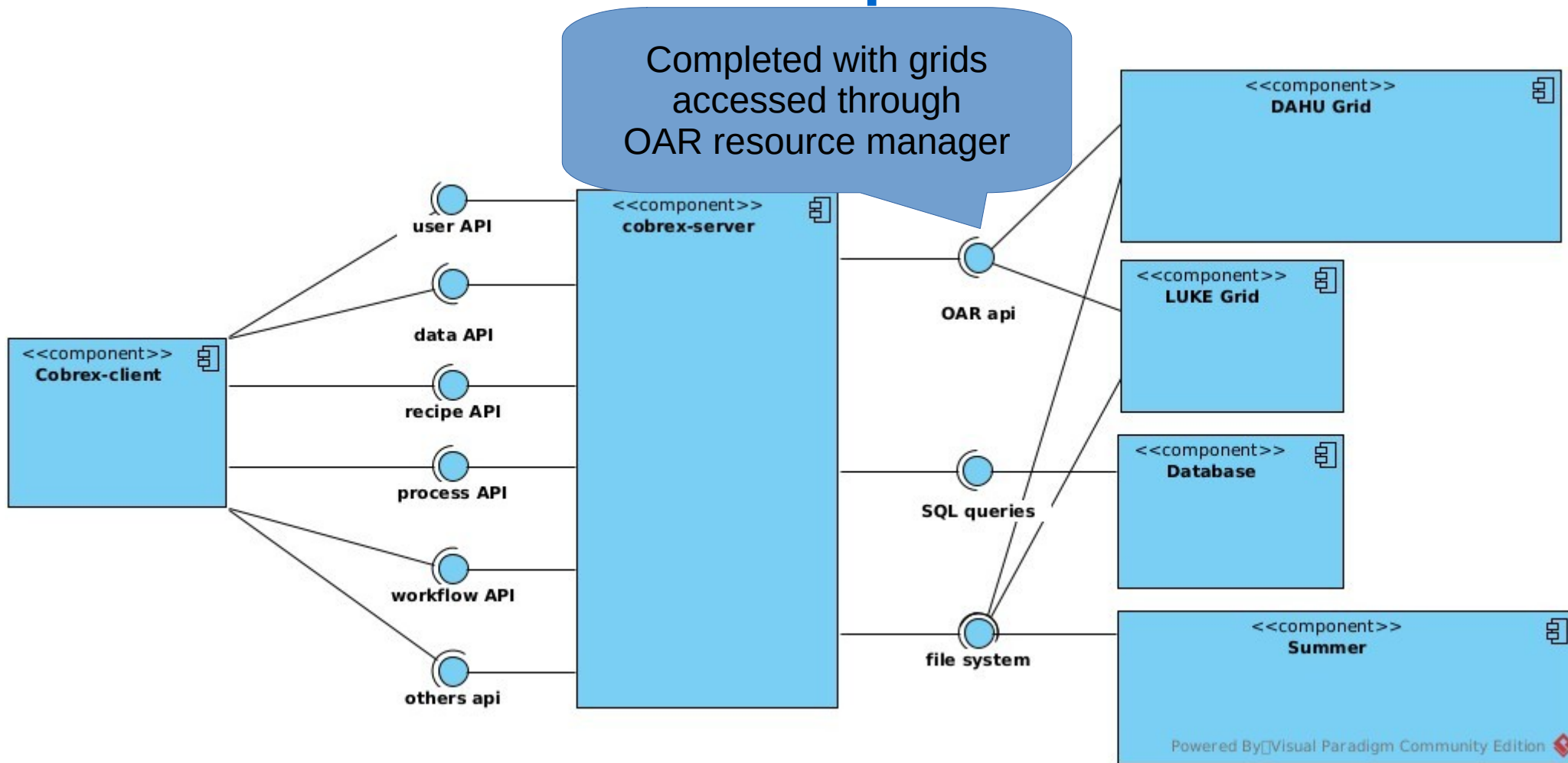
# COBREX DC data

## SW Architecture / launch recipe sequence



# COBREX DC data

## SW Architecture / complete



# 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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Category	Value
User	stephane.bergeon@univ-grenoble-alpes.fr
Users	162 users, 2 requests
Raw data	
Reduced data	1
Process	2
Validation	1 validation pending
Workspace	

At the bottom, there are buttons for 'Workspaces / Pipeline / Instrument...' and 'Workspaces Recipes'. The status bar at the bottom left says 'Status : Logged in' and the bottom right says 'Provided by COBREX'.

Import and browse data

Manage recipes (create, remove, edit, organize)

Run and browse process

Run workflow

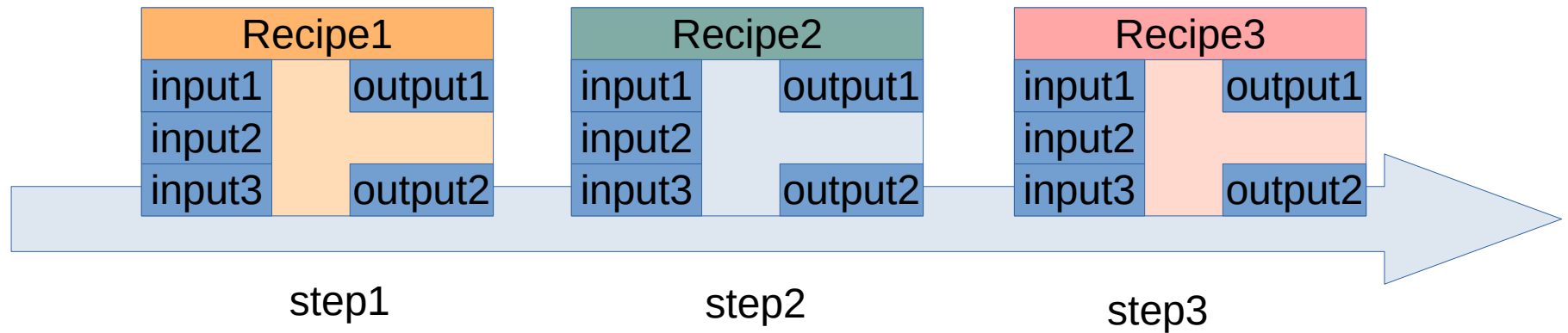


# COBREX DC workflows

## How to run workflows?

- **Workflow ?**

A workflow is a suite of recipes (steps)

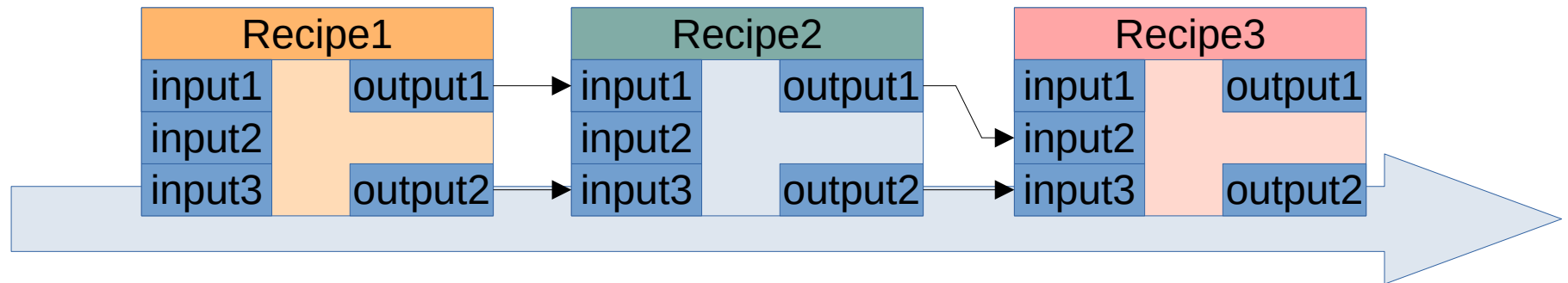


# COBREX DC workflows

## How to run workflows?

- **Workflow ?**

A workflow is as a suite of recipes (steps)



- Outputs of a step can be inputs of next steps

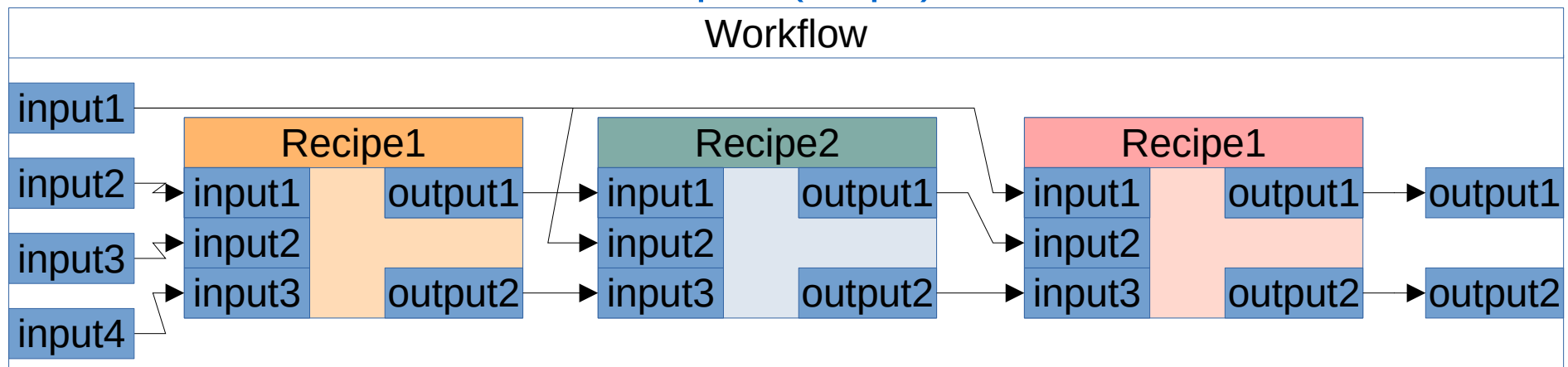


# COBREX DC workflows

## How to run workflows?

- **Workflow ?**

A workflow is as a suite of recipes (steps)



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

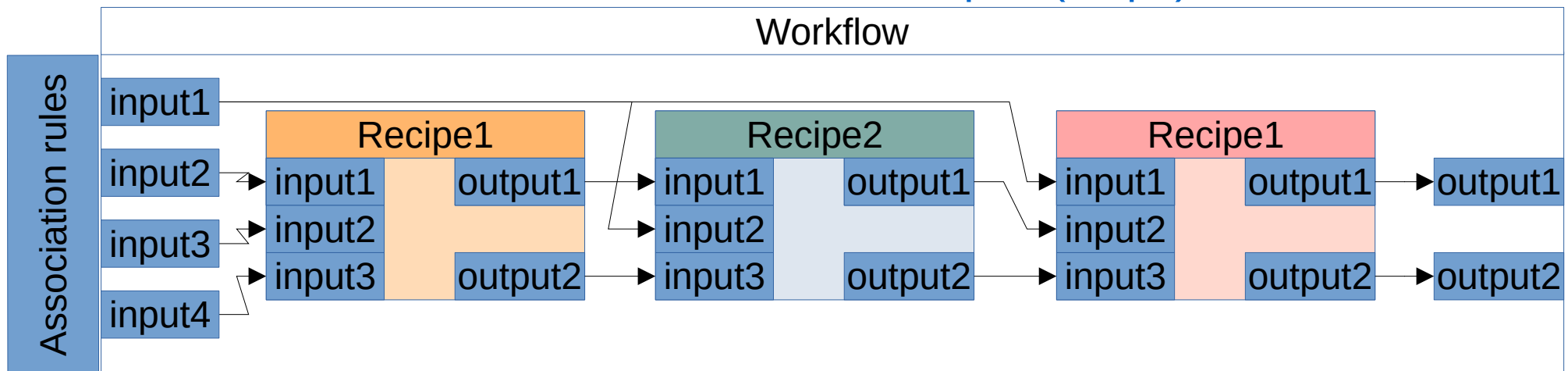


# COBREX DC workflows

## How to run workflows?

- **Workflow ?**

A workflow can be seen as a suite of recipes (steps)



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





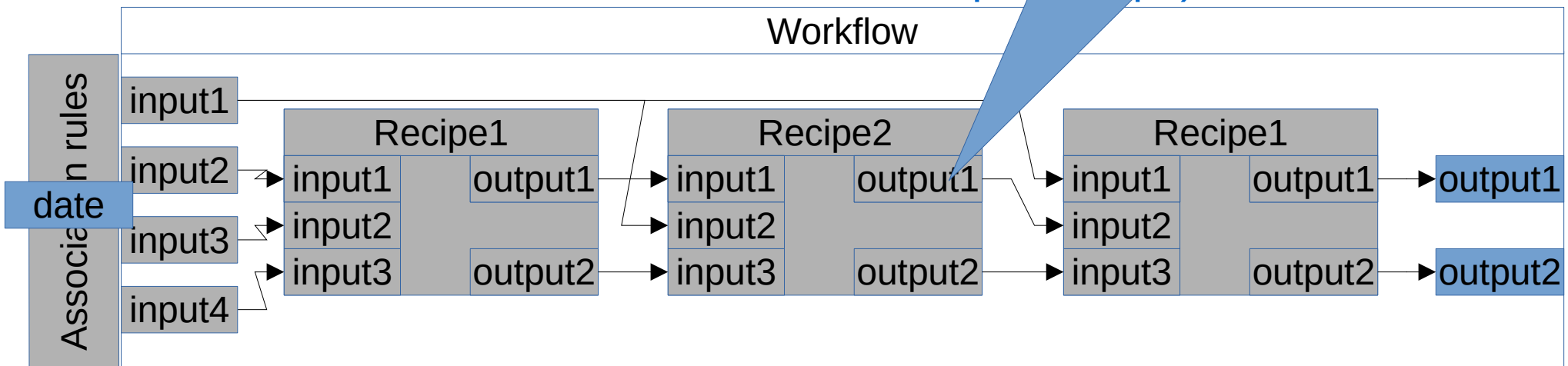
# COBREX DC workflows

## How to run workflows?

- **Workflow ?**

A workflow can be seen as a suite of recipes (steps)

Traceability



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



# COBREX DC workflows

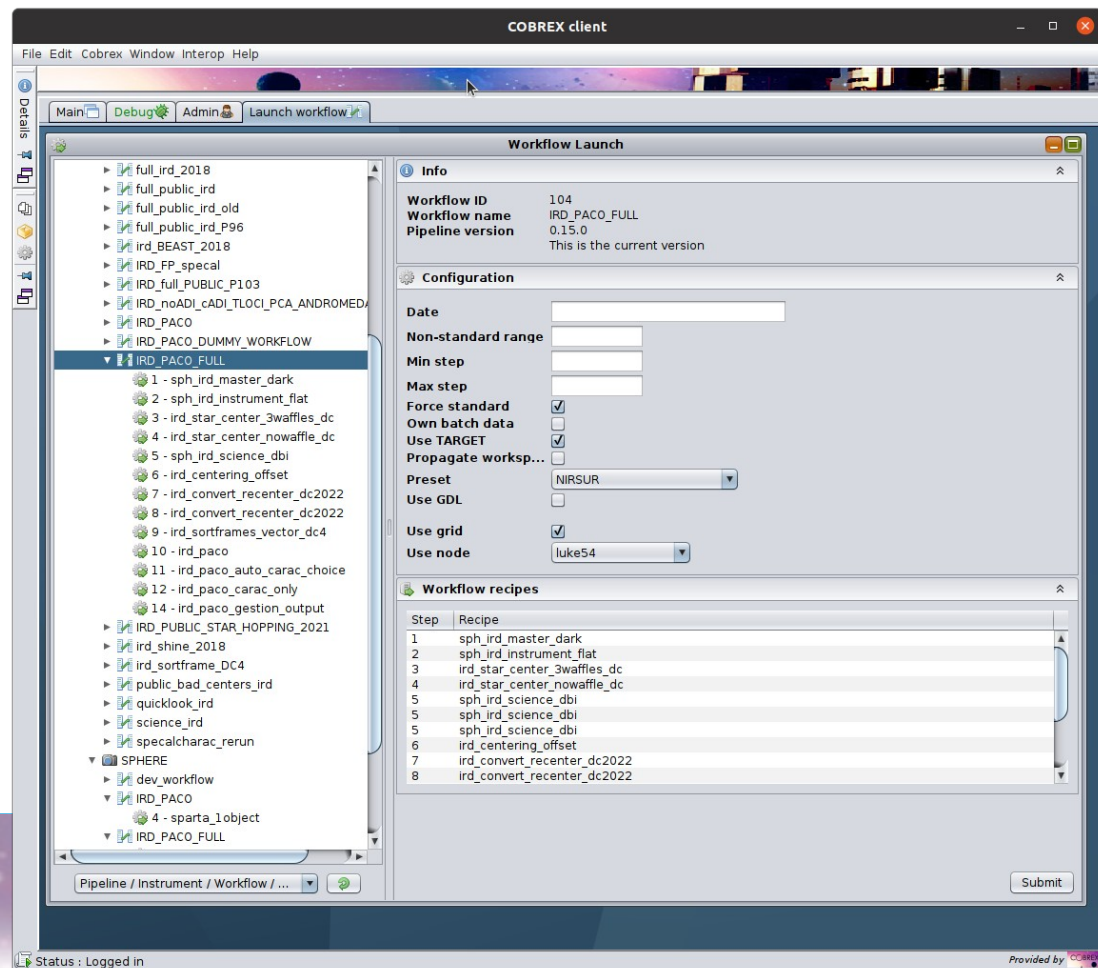
## How to run workflows?

- 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

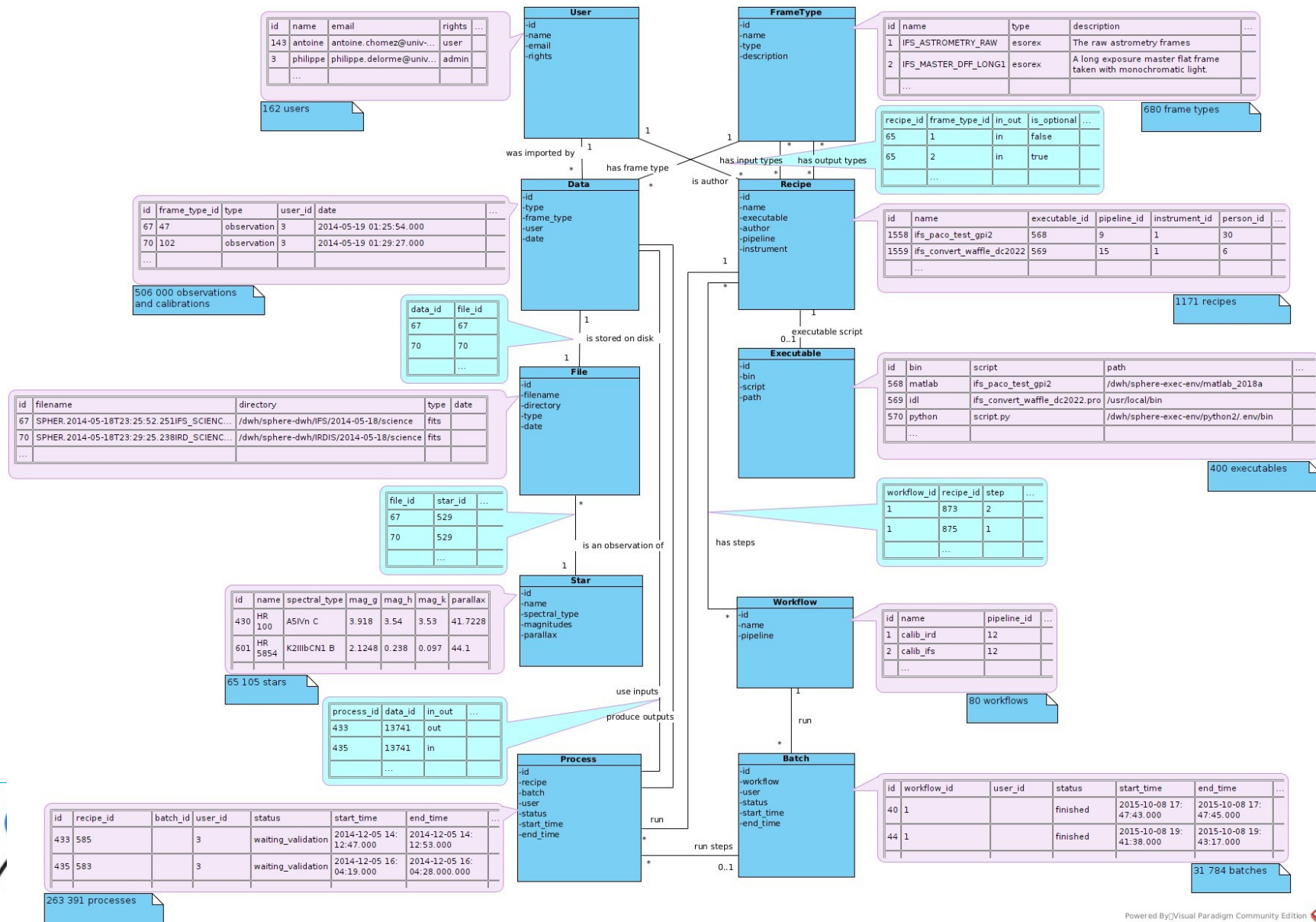
COBREX workflows :

PACO (Antoine)  
RDI (Sophia)



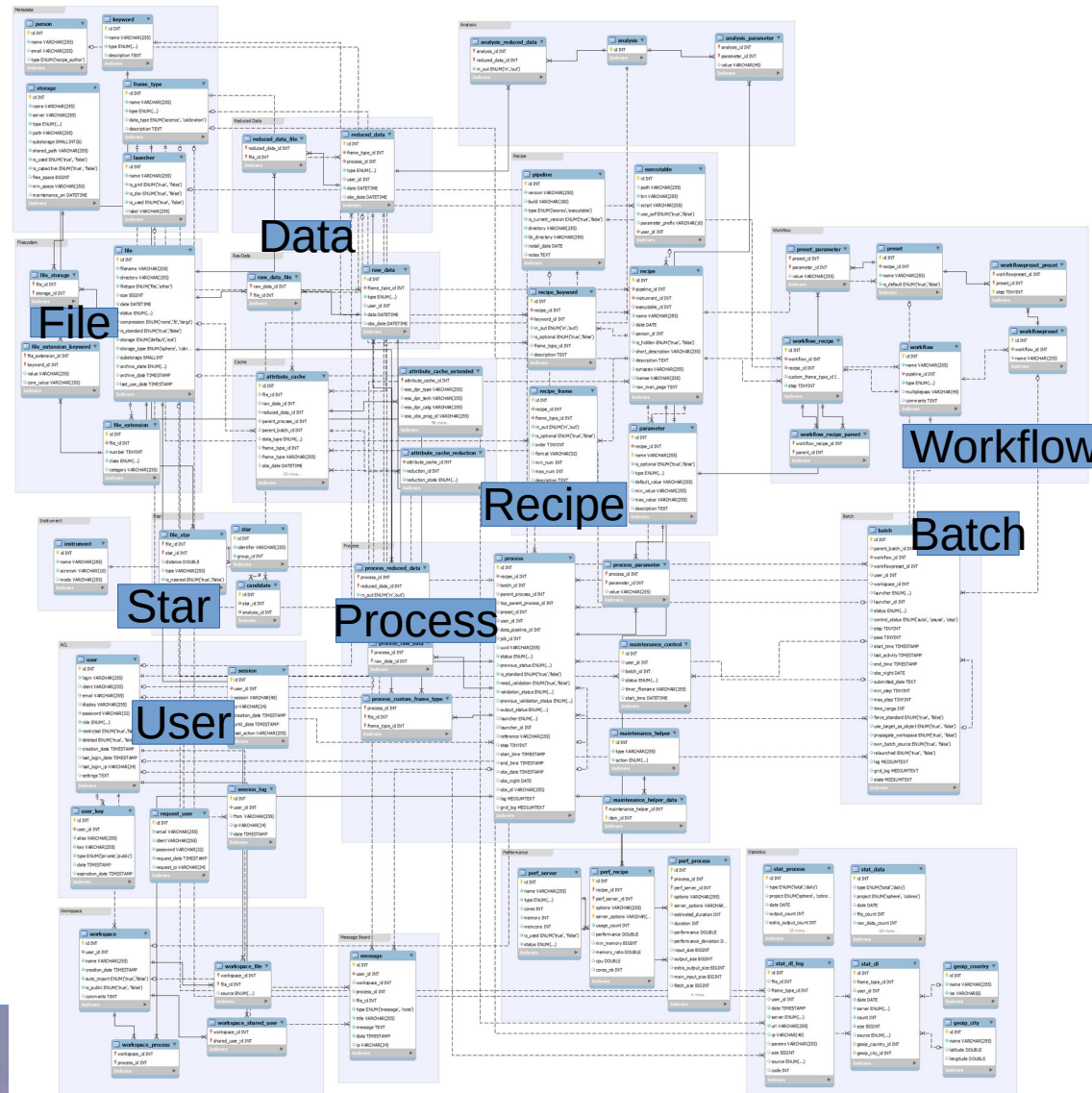
# COBREX DC database model

## Cobrex database main tables



# COBREX DC database model

## The global cobrex-dc database model



# 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\\_publicque.pdf](https://sphere.osug.fr/sites/sphere.osug.fr/IMG/pdf/manuel_reduc_publicque.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)

The screenshot displays the COBREX client interface with a workspace tree on the left and a 'Recipe Launch' configuration panel on the right. The workspace tree shows a hierarchy: SPHERE > <all> > <ungrouped> > cobrex > cobrex-recipes (10041) > 0.15.0 > ZIMPOL > sph\_zpl\_preproc\_imaging. The 'Recipe Launch' panel shows details for a recipe with ID 1168, name 'sph\_python\_test', and version 'test'. It includes fields for 'Process reference', 'Run on pipeline', 'Use grid', 'Use node', 'Custom core number', 'Custom walltime', 'Custom scratch size', 'Input frames', 'Options', and 'Output files'. A 'Share with...' dialog is also visible, showing a table of users and roles.

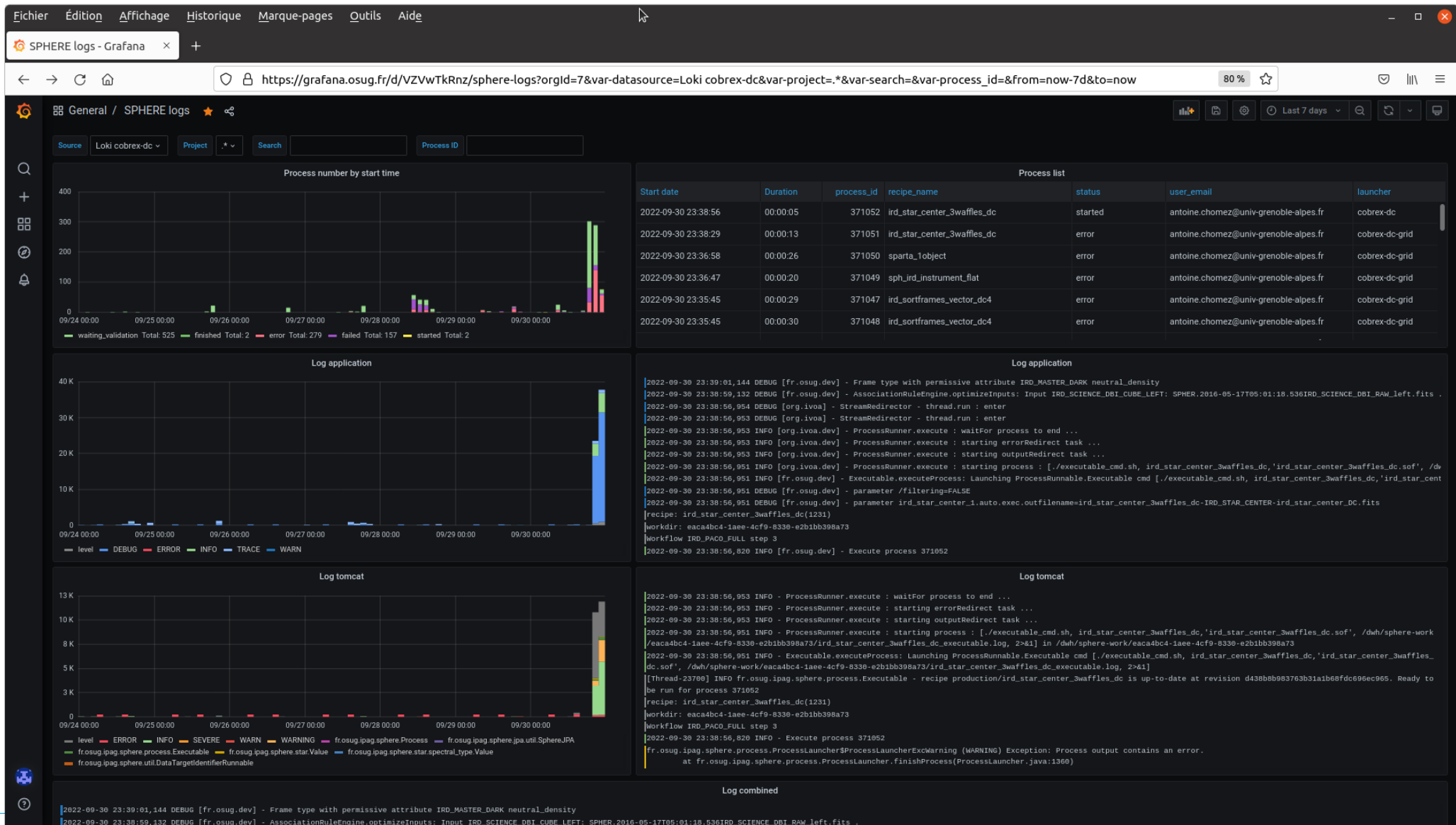
ID	User	Role	Restrict...	Delete
1	user.test@c...	user		

# COBREX DC issue tracker

The screenshot displays the COBREX DC issue tracker interface. The main area is a Kanban board with four columns: 'Open' (42 items), 'In progress' (31 items), 'To validate' (114 items), and 'Closed'. Each issue card includes a title, status tags (e.g., Critical, Incident, Feature), and an assignee. The sidebar on the left shows navigation options like 'Board', 'Milestones', and 'Merge requests'. The right-hand panel displays 'Issue details' for a selected issue, including assignee, milestones, and labels.



# COBREX DC monitoring





# COBREX DC status

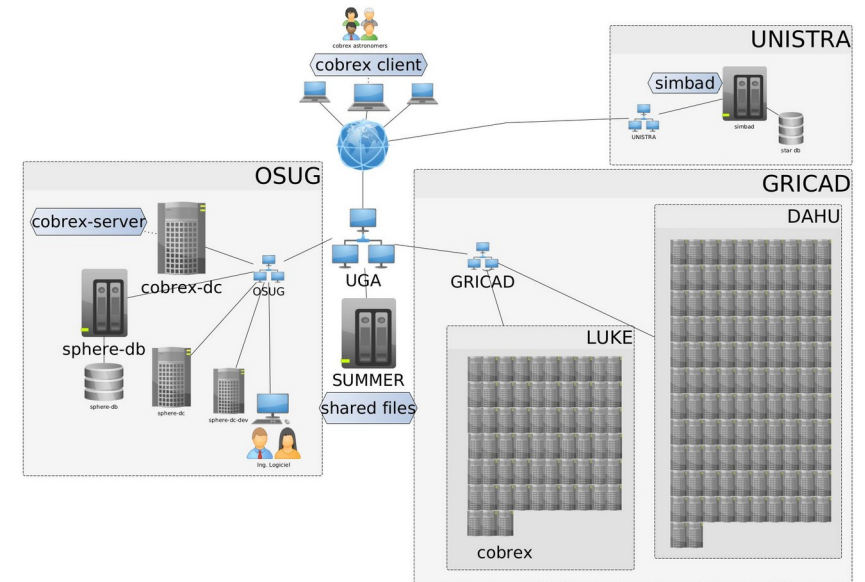
## Many features not presented...

- **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...

