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## France Life Imaging (FLI) - Information Analysis and Management (IAM)

### Provider of data storage and processing solutions for preclinical imaging studies

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#### Abstract

Animal population imaging is a domain still in its infancy that requires a similar technical support as for human population imaging: technical solutions for storing and processing large volumes of data in a distributed scientific work environment. This challenge has been identified by the national French action FLI-IAM (<https://portal.fli-iam.irisa.fr>). IAM (Information Analysis and Management) is the computation science node of France Life Imaging (FLI). It provides access to multiple imaging databases and computation resources and takes care of the interoperability between databases<sup>1</sup> and processing pipelines (local or cluster-based platforms). The preclinical work group within FLI-IAM has especially worked on a solution for hosting preclinical imaging studies, that is called Shanoir<sup>2</sup> Small Animal.

We will present the FLI-IAM architecture (fig. 1) and detail our Small Animal Shanoir (SAS) solution for hosting preclinical imaging studies (fig. 2, 3): data storage and processing execution and results integration via VIP<sup>3</sup>/Boutiques<sup>4</sup>.

Shanoir Small Animal provides:

- Control over the distribution and sharing of data
- Manages study meta-data and preclinical images using a specific ontology
  - Pathology models, therapies, anaesthetics and physiological data
- Import of Bruker and DICOM file formats (additional formats will be supported to comply with the evolution of the ecosystem)
- Secures online data sharing and data reuse
- Provides a storage of all research data in the cloud
- Original images + processing (code) + processed results
- Processes preclinical images on high performance systems, if required
- Support to integrate your data analysis pipeline and algorithms
- Enriches data with links using DOIs to Open Access, e.g. OpenAIRE

Currently FLI-IAM works on a new version of Shanoir called Shanoir-NG, with a completely new technological stack and architecture based on micro-services. We will detail the features of this new version and show how sharing of data and starting of pipelines work.

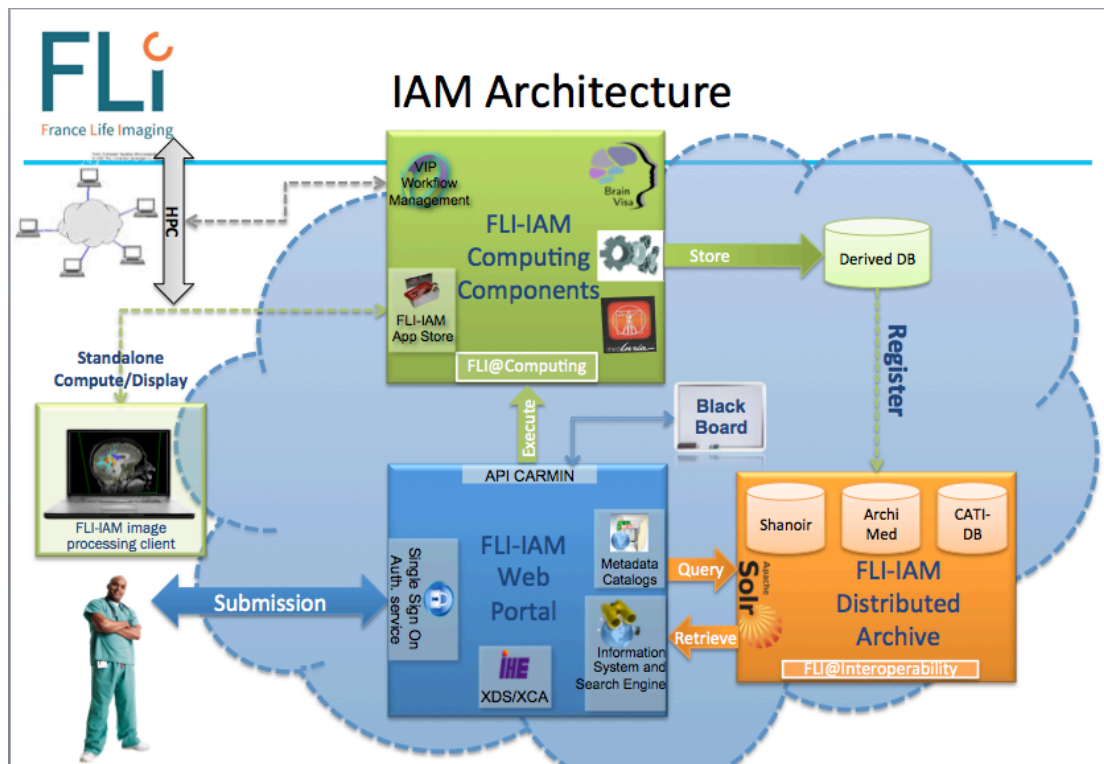


Figure 1. Architecture overview of FLI-IAM

The screenshot shows the 'shanoir' web interface. At the top, there is a navigation bar with 'Manage data', 'Import data', 'Administration', and 'Preclinical' menus. A user is logged in as 'ADMINISTRATOR ADMINISTRATOR'. The main content area is titled 'Edit subject' and contains a form with the following fields:

- Name: bobby
- Specie: rat
- Strain: wistar
- Biological type: wild
- Provider: simon
- Stabulation: grenoble

Below the form is the 'Manage subject pathologies' section, which includes a table with one entry:

Pathology	PathologyModel	Location	Start Date	End Date	Edit	Delete
Alzheimer	X38	Brain				

The table shows 1 found pathology. Below this is the 'Manage subject therapies' section, which includes a table with one entry:

Therapy	Type	Dose	Dose Unit	Frequency	Start Date	End Date	Edit	Delete
Chimio	Drug		ml					

The table shows 1 found therapy. At the bottom, there are 'Cancel' and 'Save' buttons.

Figure 2. Shanoir-NG Small Animal, snapshot of the management of an animal subject

The screenshot displays the 'shanoir' web interface for configuring an examination. The top navigation bar includes 'Manage data', 'Import data', 'Administration', and 'Preclinical'. The main content area is titled 'Edit Anesthetic' and contains several form fields:

- Anesthetic \***: Injection Iso. 6% Ket. 8mg/ml (dropdown)
- Injection interval**: During (dropdown)
- Injection site**: Caudal Vein (dropdown)
- Injection type**: Infusion (dropdown)
- Dose**: 5 (text input)
- Dose Unit**: ml (dropdown)

Below the anesthetic section are three sections for adding extra data:

- Add extra data**: File \* (Choose Files button, No file chosen)
- Add physiological data**:
  - Heart Rate data:  Yes  No
  - Respiratory Rate data:  Yes  No
  - SaO2 data:  Yes  No
  - Temperature data:  Yes  No
  - File \* (Choose Files button, No file chosen)
- Add Blood gas data**: File \* (Choose Files button, No file chosen)

Figure 3. Shanoir-NG Small Animal, snapshot of an examination

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