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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 databases¹ 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 Shanoir² 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 VIP³/Boutiques⁴.

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.

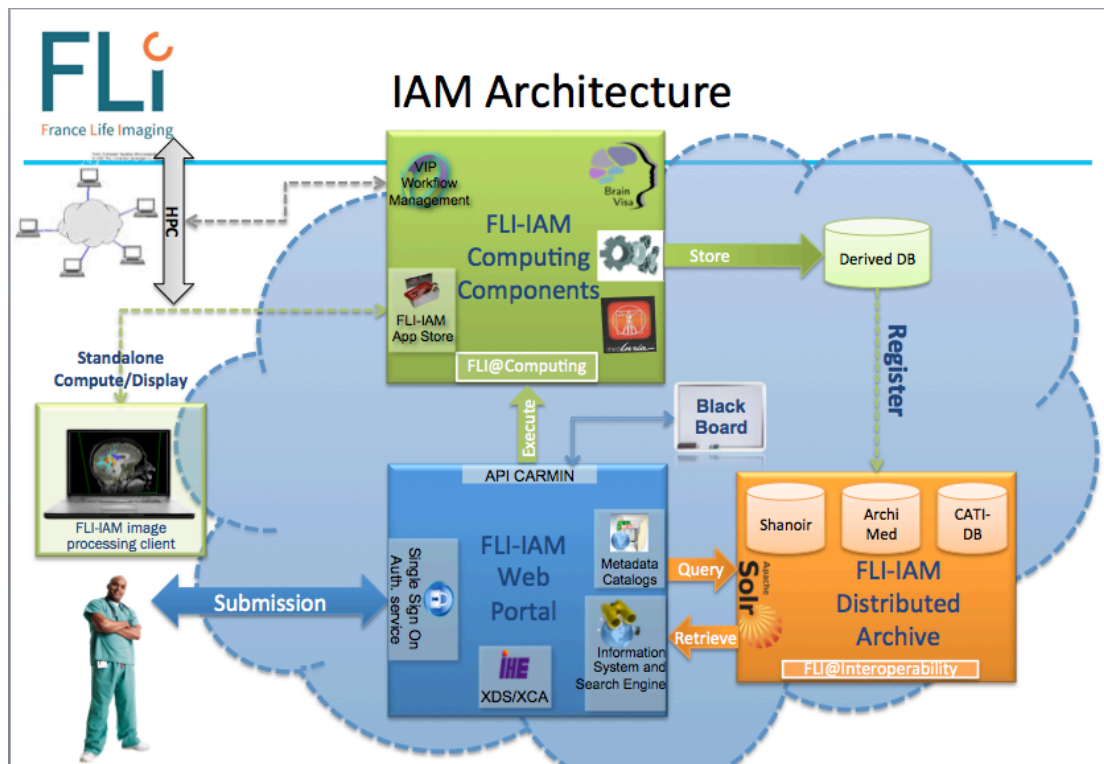


Figure 1. Architecture overview of FLI-IAM

The screenshot shows the Shanoir-NG Small Animal web interface. The top navigation bar includes 'shanoir', a user greeting 'Welcome ADMINISTRATOR ADMINISTRATOR!', and a 'Logout' button. Below the navigation are links for 'Manage data', 'Import data', 'Administration', and 'Preclinical'.

The main content area is divided into sections:

- Edit subject:** A form with fields for Name (bobby), Specie (rat), Strain (wistar), Biological type (wild), Provider (simon), and Stabulation (grenoble).
- Manage subject pathologies:** A table listing pathologies for the subject. The table has columns: Pathology, PathologyModel, Location, Start Date, End Date, Edit, and Delete. One entry is visible: Alzheimer (X38) in the Brain location.
- Manage subject therapies:** A table listing therapies. The table has columns: Therapy, Type, Dose, Dose Unit, Frequency, Start Date, End Date, Edit, and Delete. One entry is visible: Chimo (Drug) with a Dose Unit of ml.

At the bottom of the interface, 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 application interface. At the top, there is a navigation bar with the 'shanoir' logo and a menu containing 'Manage data', 'Import data', 'Administration', and 'Preclinical'. The main content area is titled 'Edit Anesthetic' and contains several form fields:

- Anesthetic ***: A dropdown menu set to 'Injection Iso. 6% Ket. 8mg/ml'.
- Injection interval**: A dropdown menu set to 'During'.
- Injection site**: A dropdown menu set to 'Caudal Vein'.
- Injection type**: A dropdown menu set to 'Infusion'.
- Dose**: A text input field containing the number '5'.
- Dose Unit**: A dropdown menu set to 'ml'.

Below the anesthetic section are three additional sections for data collection:

- Add extra data**: A file upload field labeled 'File *' with a 'Choose Files' button and the text 'No file chosen'.
- Add physiological data**: Four rows of radio button options:
 - Heart Rate data: Yes, No
 - Respiratory Rate data: Yes, No
 - SaO2 data: Yes, No
 - Temperature data: Yes, No
 A file upload field labeled 'File *' with a 'Choose Files' button and the text 'No file chosen' is also present.
- Add Blood gas data**: A file upload field labeled 'File *' with a 'Choose Files' button and the text 'No file chosen'.

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

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