

# France Life Imaging (FLI)-Information Analysis and Management (IAM) Provider of data storage and processing solutions for preclinical imaging studies

Michael Kain

## ► To cite this version:

Michael Kain. France Life Imaging (FLI)-Information Analysis and Management (IAM) Provider of data storage and processing solutions for preclinical imaging studies. Appning2018 - Workshop on Animal PoPulation ImagiNG, Jun 2018, Paris, France. pp.1-3. hal-01949362

## HAL Id: hal-01949362 https://inria.hal.science/hal-01949362

Submitted on 10 Dec 2018  $\,$ 

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

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

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

#### Author

Michael Kain, INRIA Rennes, Campus Universitaire de Beaulieu 35042 Rennes Cedex – France and the FLI-IAM consortium

#### 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

shaneir		8	Welcome ADMINIS	TRATOR ADM	NISTRATOR	! Logout
Manage data v Import data v Adminis	stration      Preclinical					
Edit subject						
Name *	bobby					
Specie *	rat	T				
Strain *	wistar	•				
Biological type *	wild	¥				
Provider *	simon	T				
Stabulation *	grenoble	•				
Manage subject pathol       Add a pathology       Image: Search	ogies in *	¥				
Add a pathology         Øg       Search         Pathology	in * PathologyModel	T	Location	Start Date	End Date	Edit Dele
Add a pathology         Bar       X         Search         Pathology         Alzheimer	in * PathologyModel X38	• Brain	Location	Start Date	End Date	Edit Dele
Add a pathology         Add a pathology         Ba       *         Pathology         Alzheimer         Selected : 0       Found : 1	in * PathologyModel X38 II:1 Page size : 20	Brain	Location	Start Date	End Date	Edit Dele
Add a pathology         Ba       Image: search         Pathology         Image: Alzheimer         Selected : 0       Found : 1         Total         Manage subject therap	in * PathologyModel X38 II:1   Page size: 20 ies	v Brain 1	Location	Start Date	End Date	Edit Dele
Add a pathology         Add a pathology         Pathology         Add a bathology         Pathology         Alzheimer         Selected : 0       Found : 1         Total         Manage subject therapy         Add a therapy	in  PathologyModel X38 II:1 Page size: 20	Brain	Location	Start Date	End Date	Edit Dele
Add a pathology         Add a pathology         Pathology         Alzheimer         Selected : 0       Found : 1         Total         Manage subject therapy         Add a therapy         Ba       * search	in * PathologyModel X38 I:1 Page size: 20 ies in *	v Brain 1	Location	Start Date	End Date	Edit Dele
Add a pathology         Add a pathology         Pathology         Alzheimer         Selected : 0       Found : 1         Total         Manage subject therapy         Add a therapy         Ball       * search	in * PathologyModel X38 I:1 Page size : 20 ies in * Dose	v Brain 1 V Dose Unit	Location	Start Date	End Date	Edit Dele
Add a pathology         Add a pathology         Pathology         Alzheimer         Selected : 0       Found : 1         Total         Add a therapy         Add a therapy         Therapy       Tyr         Chimic       Drug	ogles in * PathologyModel X38 II:1 Page size : 20 ies in * Dose	v Brain 1 Dose Unit mi 1	Frequency	Start Date	End Date	Edit Dele
Add a pathology         Add a pathology         Ba       * search         Pathology         I Alzheimer         Selected : 0       Found : 1         Therapy         Ba       * search         O       Found : 1         Therapy       Type         Chimio       Drug         Selected : 0       Found : 1         Therapy       Type         Selected : 0       Found : 1	ogies in * PathologyModel X38 Il : 1   Page size : 20 ies in * Dose Il : 1   Page size : 20	V Brain 1 Dose Unit 1	Frequency	Start Date	End Date	Edit Dele

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

s	han <b>e</b> ir					
Ma	nage data ▼ Import data ▼ Admin	istration v Preclinical v				
	Edit Anesthetic					
	Anestnetic *	Injection Iso. 6% Ket. 8mg/ml	•			
	Injection interval	During	v			
	Injection site	Caudal Vein	•			
	Injection type	Infusion	•			
	Dose	5				
	Dose Unit	ml	T			
	Add extra data					
	File *	Choose Files No file chosen				
	Add physiological data					
	Add physiological	uutu				
	Heart Rate data	🔘 Yes 💿 No				
	Respiratory Rate data	Ves No				
	SaO2 data	Ves  No				
	Temperature data	Ves No				
	File *	Choose Files No file chosen				
	Add Blood gas data					
	File *	Choose Files No file chosen				

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

#### References

1. Dojat M, Kennedy DN and Niessen W (2017) Editorial: MAPPING: MAnagement and Processing of Images for Population ImagiNG. Front. ICT 4:18. doi: 10.3389/fict.2017.00018

2. Barillot C, Bannier E, Commowick O, Corouge I, Baire A, Fakhfakh I, Guillaumont J, Yao Y and Kain M (2016) Shanoir: Applying the Software as a Service Distribution Model to Manage Brain Imaging Research Repositories. Front. ICT 3:25. doi: 10.3389/fict.2016.00025

3. Tristan Glatard, Carole Lartizien, Bernard Gibaud, Rafael Ferreira da Silva, Germain Forestier, et al.. A virtual imaging platform for multi-modality medical image simulation.. IEEE Transactions on Medical Imaging, Institute of Electrical and Electronics Engineers, 2013, 32 (1), pp.110-8. doi: (10.1109/TMI.2012.2220154) . (inserm-00762497)

4. Glatard T, Da Silva RF, Boujelben N, ADALAT R, Beck N, Rioux P, Rousseau M, Deelman E and Evans AC (2015). Boutiques: an application-sharing system based on Linux containers.
Front. Neurosci. Conference Abstract: Neuroinformatics 2015. doi: 10.3389/conf.fnins.2015.91.00012