



## Infrastructure 'Information Analysis and Management' (IAM)

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## Many Good Reasons for Sharing Data and Tools in *In Vivo* Imaging At Least 3 ....

#### • Scientific

« Power failure: why small sample size undermines the reliability of neuroscience »

#### Button et al. Nat. Neurosc 2013

« Why most published research findings are false" Ioannidis Plos Med 2005

"Data from preclinical animal studies appear to be associated with even greater bias »

#### Ioannidis ScienceTranslationalMed 2012,

« Why small low-powered studies are worse than large high-powered studies and how to protect against trivial findings in research » Ingre Neuroimage 2012

- Underpowered is endemic (false positive, false negative)

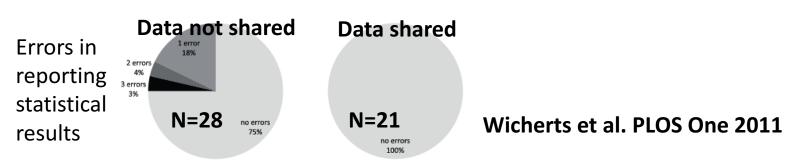




## Many Good Reasons for Sharing Data and Tools in *In Vivo* Imaging

## At Least 3 ....

- Scientific
  - Data analysis and reporting are often selective and biased







# Many Good Reasons for Sharing Data and Tools in *In Vivo* Imaging

## At Least 3 ....

- Scientific
  - Rarely replicated so false solutions persist
  - New questions, increasing the speed of discovery

Large cohort, Re-analysis, Replication, MetaAnalysis « collective mind » Fox et al. Ann Rev Neurosci 2014 « crowd science » Franzoni & Suerman Res Policy 2014





## **Many Good Reasons**

## for Sharing Data and Tools in In Vivo Imaging

## • Economic

Data Acquisition: e.g. neuroimaging 300€/H 30 subjects x 2 groups 18 K€ ... Many efforts for image processing tools development and validation Avoid reinventing existing data and tools ....

**Reducing cost doing science, maximize investment** 





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• Ethic

Healthy subject and patients give their consent for contributing to knowledge advancement.

For preclinical studies, ethical obligation to ensure that the animals are not wasted.

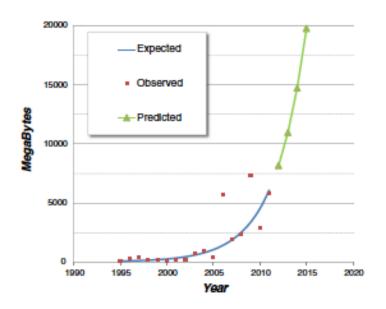
**Maximize their participation** 





NeuroImage, indicates that since 1995 the amount of data collected has doubled approximately every 26 months

This is likely to be an under-estimate for raw dataset sizes: advances in MRI physics are accelerating the pace at which data can be aquired per unit time.



Van Horn & Toga Brain Im Behav 2014

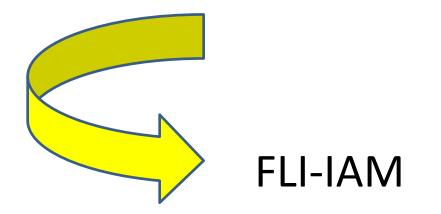
 (1) respect for participant privacy and confidentiality;
 (2) logistics of data accessibility;
 And
 (3) long-term sustainability.





**Researchers, journals and funding agencies must work together** to identify and implement technical solutions that allow the most effective data sharing **without greatly increasing the burden on researchers.** 

Poldrack and Gorgolewski Nat Neuro 2014







## France Life Imaging (FLI)

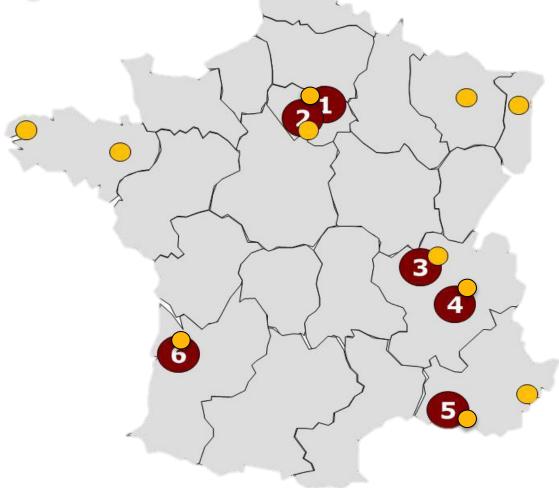
- France Life Imaging (FLI) is a large-scale research infrastructure project, aimed at establishing a coordinated and harmonized network of biomedical imaging in France: <u>http://francelifeimaging.fr</u>
- Its mission is to:
  - coordinate nation-wide research activities concerned with in vivo imaging and combine the skills to push the current technological barriers
  - provide scientists a convenient access to a complete range of imaging technologies (150 imaging systems) and integrated services; in addition, the infrastructure will be open to collaborations with industrial partners
  - FLI will also propose training opportunities associated with imaging platforms.
     FLI complements France BioImaging for *in-vitro* Imaging (FBI).
- 2012, Investissements d'Avenir Infrastructure en Biologie et Santé
- 37 million Euros for 8 years





#### 6 physical nodes

+1 transversal node for Information Analysis and Management







#### Information Analysis and Management (IAM) - Goals

#### • Objectives of the node:

- Specify and set up a hardware and software infrastructure for the management and processing of *in vivo* images
- Elaborate and implement usage scenarios of the infrastructure
- Set-up an operational structure to operate the infrastructure, that can be self-funded from internal seed funding

#### • For:

- Clinician: to conduct large and/or clinical and preclinical research studies, involving new innovative in-vivo medical imaging and therapeutic procedures
- Pharma: to provide pharma and CRO companies high technological computational solutions for *in vivo* imaging
- Medical imaging community: to allow experimentation and validation of new innovative in-vivo imaging solutions
- Using strengths: based on **existing** high technological expertise and experience:
  - From data management solutions: ArchiMed, CATI-DB, SHANOIR ...
  - From medical image processing solutions: BrainVisa, medInria, VIP, ...
  - In cooperation with large national clinical cohorts: CATI, OFSEP, ...





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The IAM node consists in developing a versatile software platform made up of several subcomponents, which allows inter-connection of hardware facilities and software platforms.





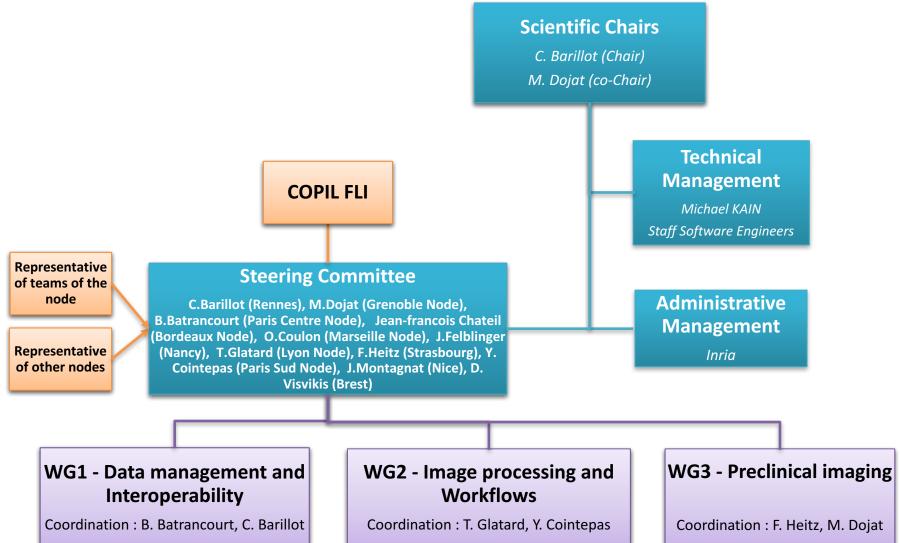
#### Information Analysis and Management (IAM) - Facts

#### • Founding partners:

- Top national teams in medical imaging:
   CEA (Paris), CNRS (Bordeaux, Lyon, Strasbourg, Marseille), INRIA (Rennes),
   INSERM (Brest, Grenoble, Nancy, Paris)
- Currently 15 engineers working full-time, in 8 cities all over France
- Deployment stages:
  - Initial stage (2013 end of 2017/18), phase 1:
    - Set up of the infrastructure, specification of the needs, roadmap definition for the development and the exploitation of the infrastructure based on the roadmap
    - Start a pilot phase on a limited number of clinical and preclinical research application domains
  - Operational stage (after 2017/18), phase 2:
    - **Open call** to select industrial management and exploitation providers of the developed infrastructure (including SME)
    - Extend the infrastructure to broaden the range of clinical and preclinical research application domains

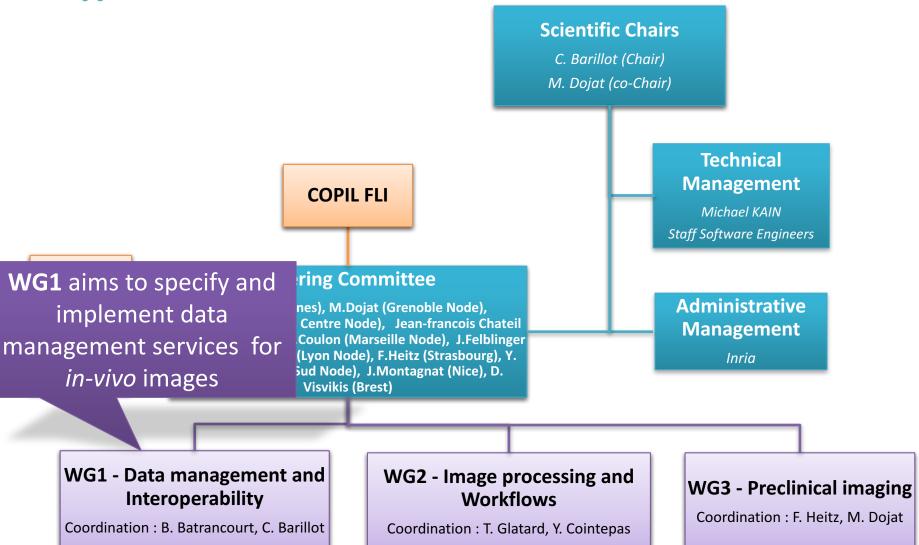






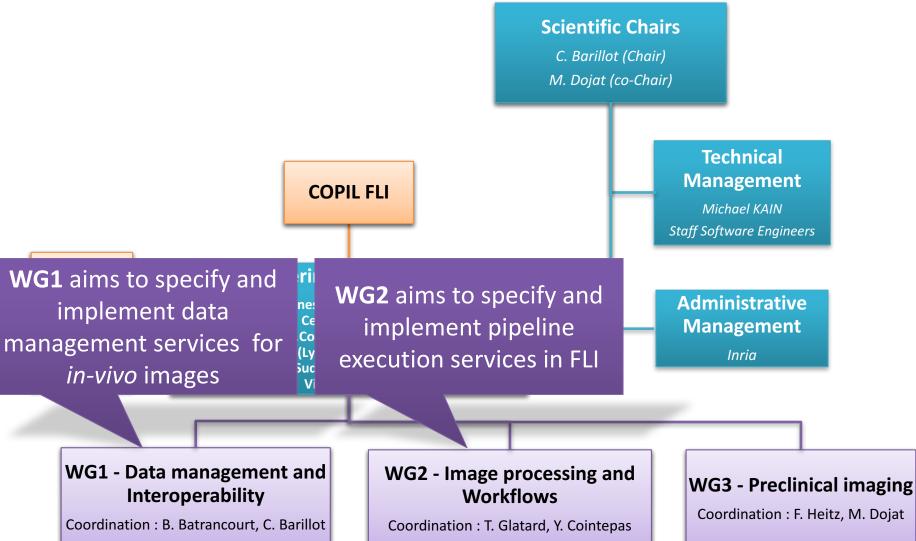






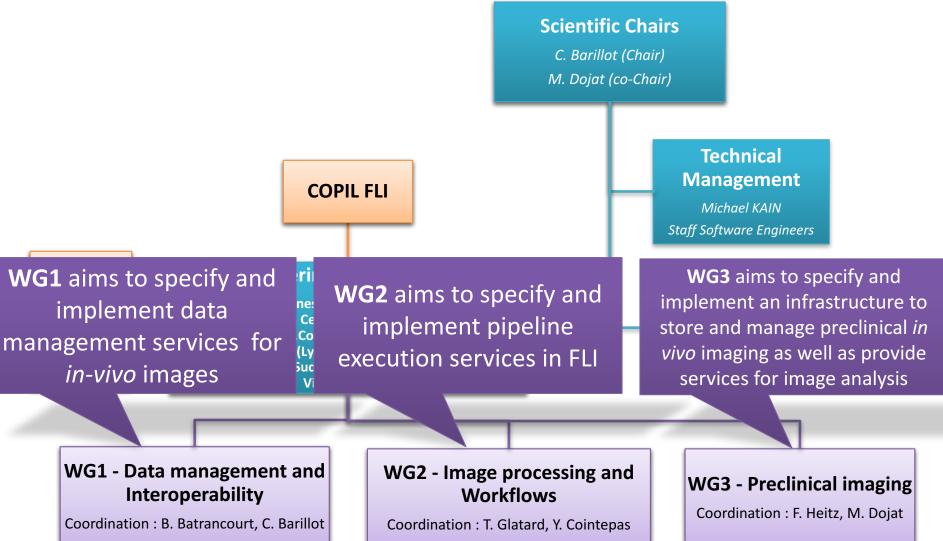








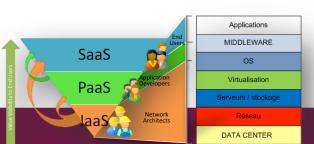






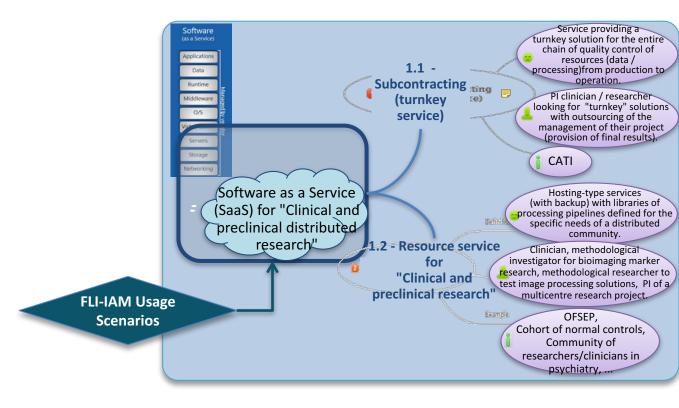


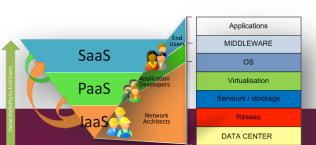






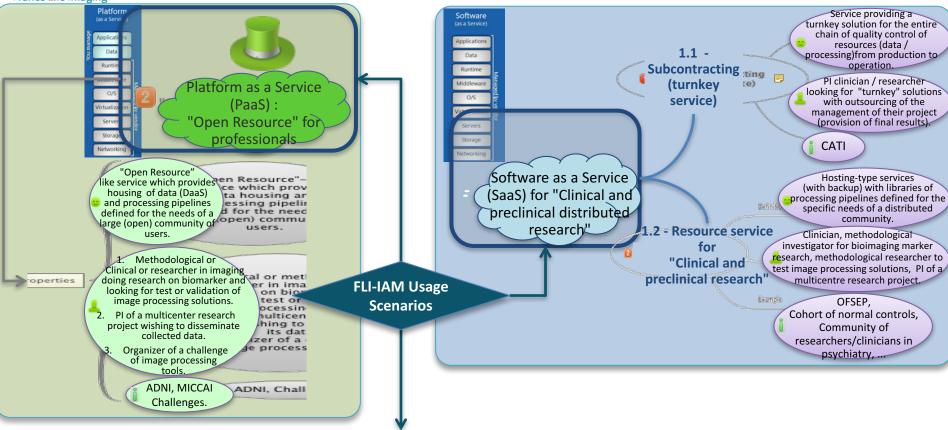


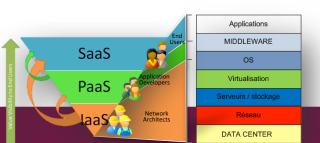






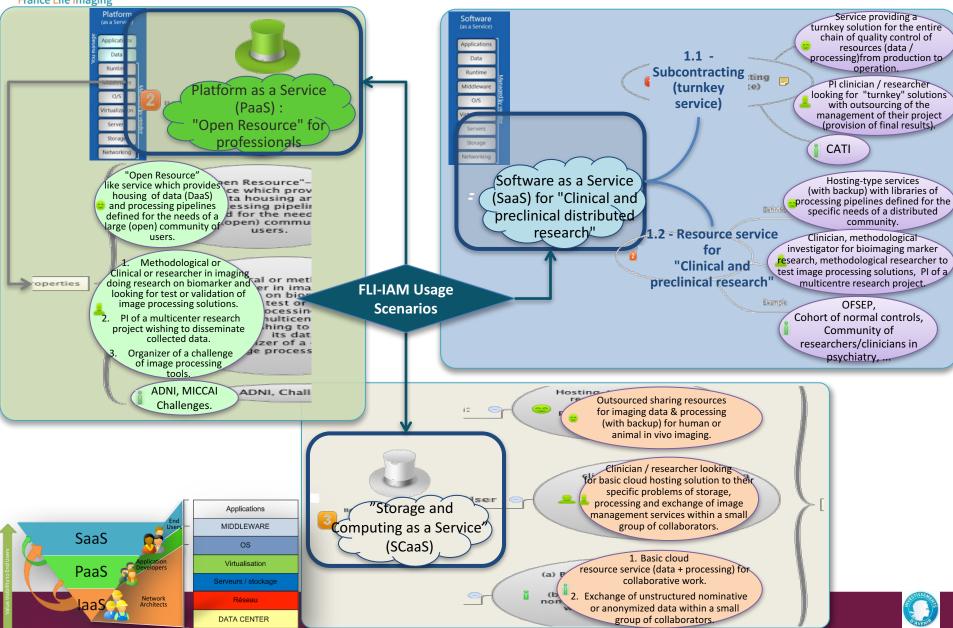






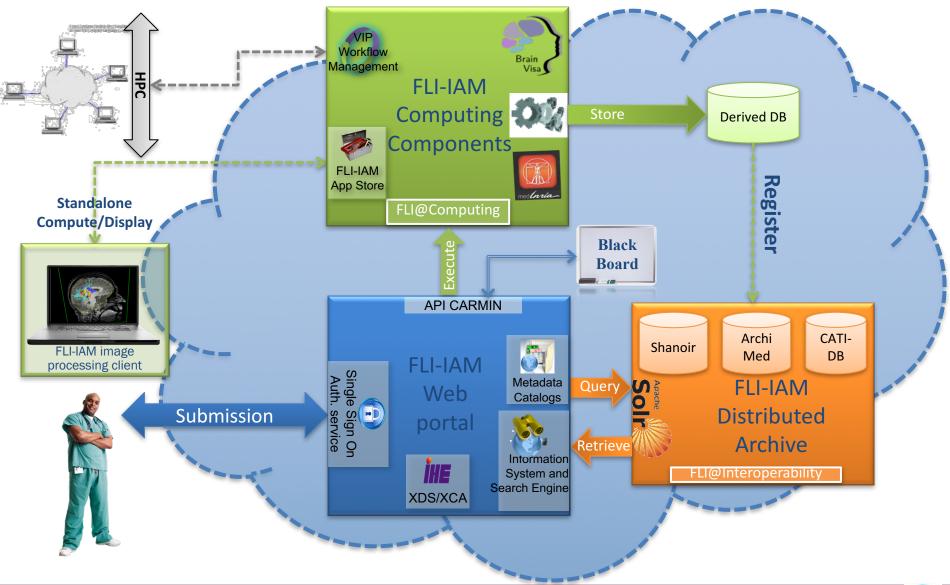






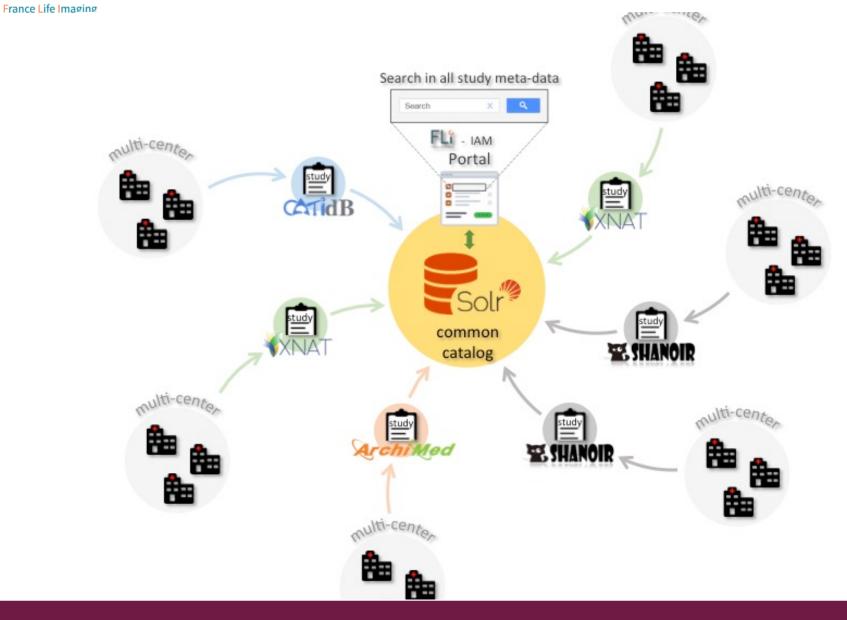
## FLI-IAM Computational architecture

France Life Imaging





## FLI-IAM – Common Catalog v3







## FLI-IAM – CARMIN-API, v0.3

- CARMIN:
  - Common API for Reaching Medical Imaging Network or
  - Common web API for ReMote pipeline Invocation
- Two web service technologies
  - SOAP
  - HTTPS/JSON abusively called "REST"
- https://github.com/fli-iam/CARMIN/
- Core API features:
  - Authentication
  - Platform information
  - Pipelines information
  - Pipeline execution
  - Study isolation (optional)





## **FLI-IAM Node: Preclinical Imaging**

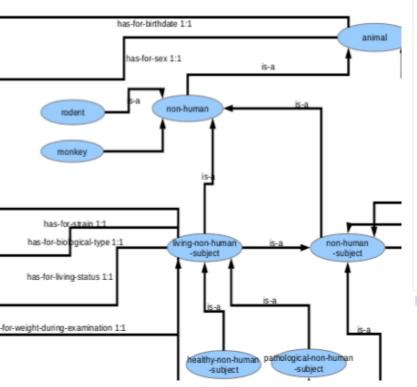
- 68% of FLI plateforms
- Bruker scanners
- Shanoir-SA: Extension of Small Animal Imaging to Shanoir system





## **FLI-IAM Node: Preclinical Imaging**

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2015/03/09, 7T - Souris 5 (id = 92)     CRMBM Marselle - Mouse     CRMBM Marselle - Mouse     CRMBM Marselle - Mouse     GRN Grenoble Institut Neurosciences - Mouse     GRN Grenoble Institut Neurosciences - Mouse     CRMBM - Franck Kober - Researcher     CRMBM - Franck Kober - Researcher     GRnore - Biospec 4740USR A-7T (MR) XX - CRMBM     Grenoble Institut des Neurosciences - Michel Dojat - Researcher     Bruker - Biospec 4740USR A-7T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 9420USR 9-4T (MR) - Grenoble Institut des Neurosciences     Bruker - Bios	2015/03/09, 7T - Souris 4 (i	d = 91)	
FRIM Paris - Mouse     GIN Grenoble Institut Neurosciences - Mouse     CUEB Starbourg - Mouse     CUEB Starbourg - Mouse     Experimental Groups (is associated to)     Principal investigators and Centers (takes place in and with)     Common Prince Notor - Researcher     Bruker - Biospee 47/40USR 4.77 (MR) Cancoble Institut des Neurosciences     Bruker - Biospee 74/20USR 7.77 (MR) - Concoble Institut des Neurosciences     Bruker - Biospee 47020USR 7.07 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut	• 🛅 2015/03/09, 7T - Souris 5 (i	d = 92)	
FRIM Paris - Mouse     GIN Grenoble Institut Neurosciences - Mouse     CUEB Starbourg - Mouse     CUEB Starbourg - Mouse     Experimental Groups (is associated to)     Principal investigators and Centers (takes place in and with)     Common Prince Notor - Researcher     Bruker - Biospee 47/40USR 4.77 (MR) Cancoble Institut des Neurosciences     Bruker - Biospee 74/20USR 7.77 (MR) - Concoble Institut des Neurosciences     Bruker - Biospee 47020USR 7.07 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospee 94/20USR 9.47 (MR) - Grenoble Institut	CRMBM Marseille - Mouse		
Soft Grenoble Institut Neurosciences - Mouse     Experimental Groups (is associated to)     Principal investigators and Centers (lakes place in and with)     ✓			
Experimental Groups (is associated to)  Fincipal investigators and Centers (takes place in and with)  CRMBM Franck Koher - Researcher  Gronoble Institut Generative Structure - Biospec 47/40USR 4.77 (MR) CANDBM  Corenoble Institut des Neurosciences - Michele Dojat - Researcher  Gronoble Institut des Neurosciences - Michele Dojat - Researcher  Gronoble Institut des Neurosciences - Biospec 47/2002 R 4.77 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 49/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences  Gronoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Bruker - Biospec 94/20USR 94/20USR 94/20USR 94/20USR 94/20USR 94		ences - Mouse	
<ul> <li>Principal investigators and Centers (takes place in and with)</li> <li>CRMBM - Franck Kober - Researcher</li> <li>Bruker - Biospec 7/40USR A-7T (MR) XX - CRMBM</li> <li>Granoble Institut des Neurosciences - Michel Dojat - Researcher</li> <li>Bruker - Biospec 7/40USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 7/40USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Bruker - Biospec 94/20USR 9.47T (MR) - Grenoble Institut des Neurosciences</li> <li>Members</li> <li>admin</li> <li>Members that can download datasets produced in the research study</li> </ul>	ICUBE Strasbourg - Mouse		
CRMBM - Franck Kober - Researcher     GRMBM - Franck Kober - Researcher     Greenoble Institut des Neurosciences - Michel Dojat - Researcher     Grenoble Institut des Neurosciences - Michel Dojat - Researcher     Grenoble Institut des Neurosciences     Bruker - Biospec 47/40USR 7.0T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) - Grenoble Institut des Neurosciences     Grenoble Institut des Neurosciences     Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) - Grenoble Institut des Neurosciences     Grenoble Institut des Neurosciences     Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) - Grenoble Institut des Neurosciences     Grenobles	Experimental Groups (is associated	to)	
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Controble Institut des Neurosciences - Michel Dojat - Researcher     Bruker - Biospec 7/40USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 7020USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.47 (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.47 (MR) 1 - Grenoble Institut des Neurosciences     Members     Responsibles     admin     Members that can download datasets produced in the research study	CRMBM - Franck Kober - Res	earcher	
Bruker - Biospec 47/40USR 4.7T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 70/20USR 7.0T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) 1 - Grenoble Institut des Neurosciences     Members     CResponsibles     admin     Members that can download datasets produced in the research study	Bruker - Biospec 47/40USF	t 4.7T (MR) XX - CRMBM	
Bruker - Biospec 70/20USR 7.0T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) 1 - Grenoble Institut des Neurosciences     Members     Responsibles     admin     Members that can download datasets produced in the research study	Grenoble Institut des Neuroscie	nces - Michel Dojat - Researcher	
Bruker - Biospec 94/20USR 9.4T (MR) - Grenoble Institut des Neurosciences     Bruker - Biospec 94/20USR 9.4T (MR) 1 - Grenoble Institut des Neurosciences     Members     Responsibles     admin     Members that can download datasets produced in the research study	Bruker - Biospec 47/40USF	t 4.7T (MR) - Grenoble Institut des Neurosciences	
Bruker - Biospec 94/20USR 9.4T (MR) 1 - Grenoble Institut des Neurosciences     Members     Bruker - Biospec 94/20USR 9.4T (MR) 1 - Grenoble Institut des Neurosciences     almines     admin     admines     Members that can download datasets produced in the research study	Bruker - Biospec 70/20USF	t 7.0T (MR) - Grenoble Institut des Neurosciences	
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 Subjects 4.7T\_Souris\_1 - Mouse A.7T\_Souris\_2 - Mouse 🔏 4.7T\_Souris\_3 - Mouse 🙈 4.7T\_Souris\_4 - Mouse 😹 4.7T\_Souris\_5 - Mouse 😹 4.7T\_Souris\_6 - Mouse A 7T\_CERMEP\_01 - Mouse 🙈 7T\_CERMEP\_02 - Mouse 😹 7T\_CERMEP\_03 - Mouse 😹 7T\_CERMEP\_04 - Mouse 🟯 7T\_CERMEP\_05 - Mouse 鷐 7T\_Souris\_2 - Mouse 鷐 7T\_Souris\_3 - Mouse 鷐 7T\_Souris\_4 - Mouse 🙈 7T\_Souris\_5 - Mouse 😹 7T\_Souris\_6 - Mouse 😹 9.4T\_Souris\_2 - Mouse 🙈 9.4T\_Souris\_3 - Mouse 😹 9.4T\_Souris\_4 - Mouse 🙈 9.4T\_Souris\_5 - Mouse 🚇 9.4T\_Souris\_6 - Mouse PG\_FLI-IAM\_003 - Mouse 🙈 PG\_FLI-IAM\_FRIM001 - Mouse 🙈 PG\_FLI-IAM\_FRIM002 - Mouse 🙈 PG\_FLI-IAM\_FRIM004 - Mouse 🙈 PG\_FLI-IAM\_FRIM005 - Mouse 😹 mrsiam1 - Mouse 🚇 mrsiam2 - Mouse 🚜 mrsiam3 - Mouse 🚜 mrsiam4 - Mouse 😹 mrsiam5 - Mouse 😹 mrsiam6 - Mouse





## **FLI-IAM - Applications**

#### 3 usage scenarios identified

- Software as a Service (SaaS)
  - 1.a: turn-key service
  - 1.b: resource service
- Platform as a Service (PaaS)
  - Show case: organization of two scientific challenges
- Storage + Computing as a Service (SCaaS)





## **FLI-IAM - Applications**

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## • MICCAI 2016

- Medical Image Computing and Computer Assisted Intervention
- Biggest conference on medical image computing
- SATELLITE EVENTS: Challenges MSSEG + PETSEG
- Ongoing challenges:
  - Scientifics ask for data access and pipeline integration
- More on <u>https://portal.fli-iam.irisa.fr/services</u>





#### FLI-IAM – Real life example – PaaS Challenge MICCAI 2016 - MSSEG

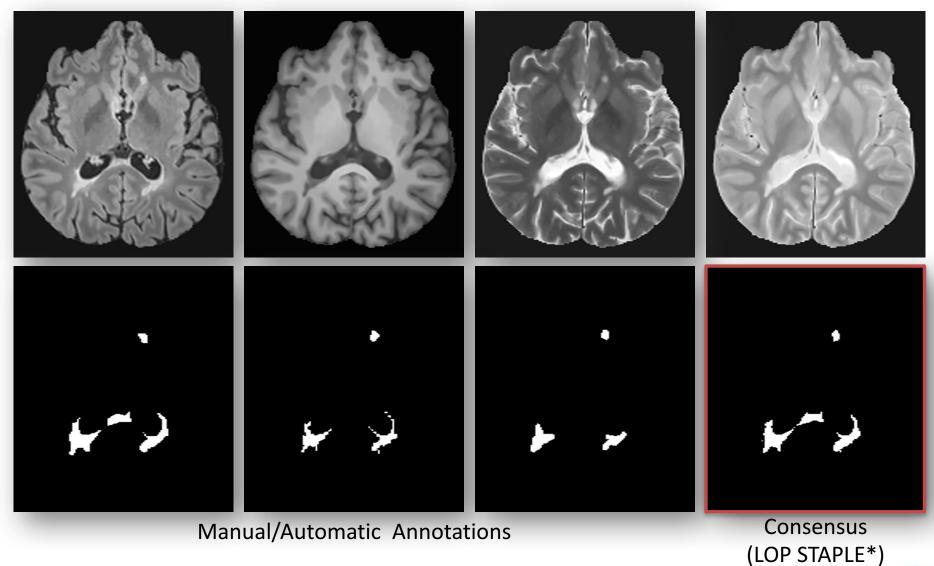
- Data
  - 53 patients (4 different MR scanners @ 1.5 & 3T)
  - Modalities : 3DFLAIR, T2/DP, 3D T1-w, 3D T1-Gado
  - 7 manual annotations per patient
- Two groups of data: 15 training et 38 testing
- Raw and pre-processed data available
  - Registration, denoising, inhomogeneity correction, brain segmentation/masking
  - Up to challenger's preference

Center / #exams	Training set	Testing set
GE Discovery 3T (Bordeaux)	0	8
Philips Ingenia 3T (Lyon)	5	10
Siemens Aera 1.5T (Lyon)	5	10
Siemens Verio 3T (Rennes)	5	10
Total	15	38





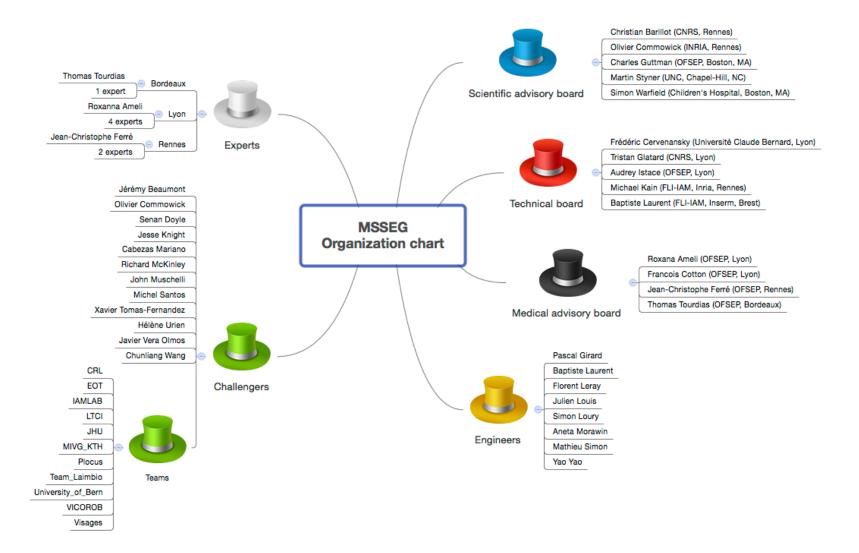
#### FLI-IAM – Real life example – PaaS MSSEG - Data







## FLI-IAM – Real life example – PaaS MSSEG - People network

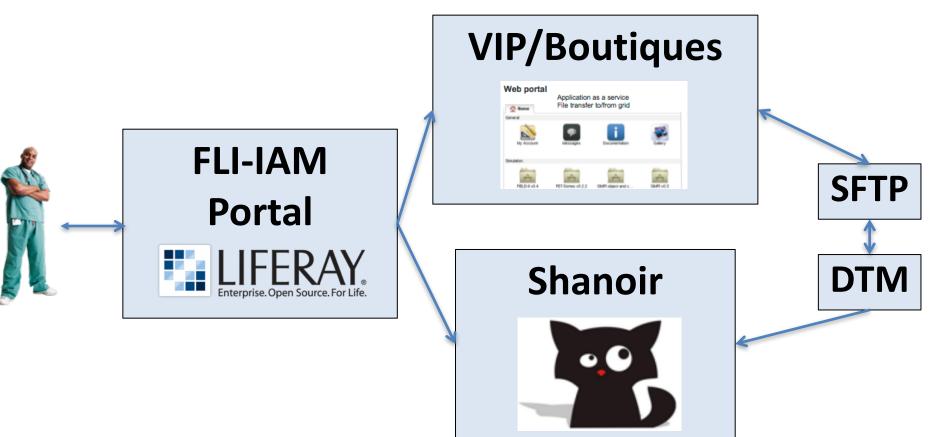






#### FLI-IAM – Real life example – PaaS Architecture

**Processing platform** 

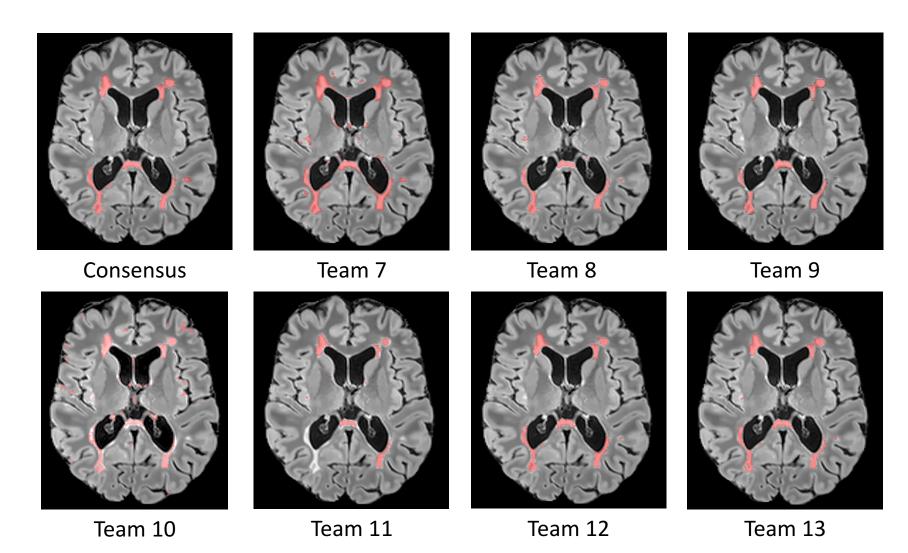


**Database for medical images** 





#### **Some Results**





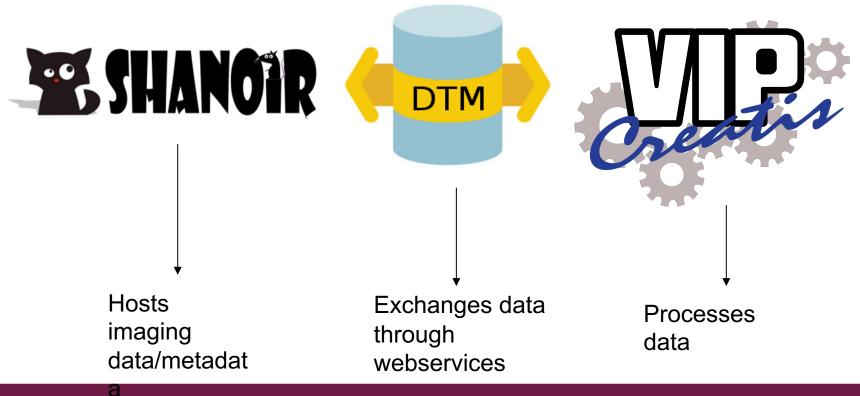
Evaluated method	Computation time (on 38 patients)
Team 1	1 day 00h14
Team 2	15h37
Team 3	2 days 00h54
Team 4	04h24
Team 5	15h28
Team 6	2 days 05h40
Team 7	10 days 23h19
Team 8	11h17
Team 9	05h40
Team 10 (*)	5 days 18h37
Team 11	2 days 11h14
Team 12	4 days 16h43
Team 13	2 days 01h03





# DTM – Data Transfer Module

# Exchange data between platforms Shanoir\_SA $\leftrightarrow$ VIP

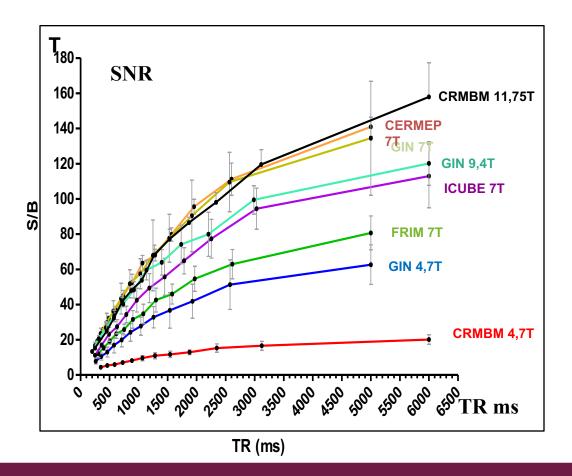




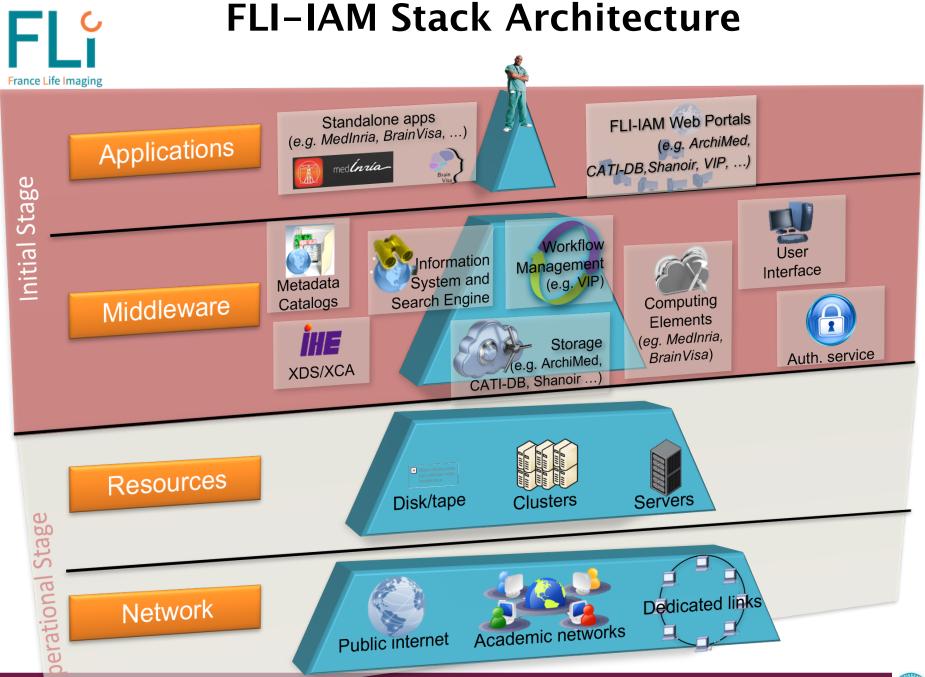




- Biophysic UC (5 centers, 5 magnetic rield strength)
   SNR
  - Processing pipelines for T1 and T2 maps computation

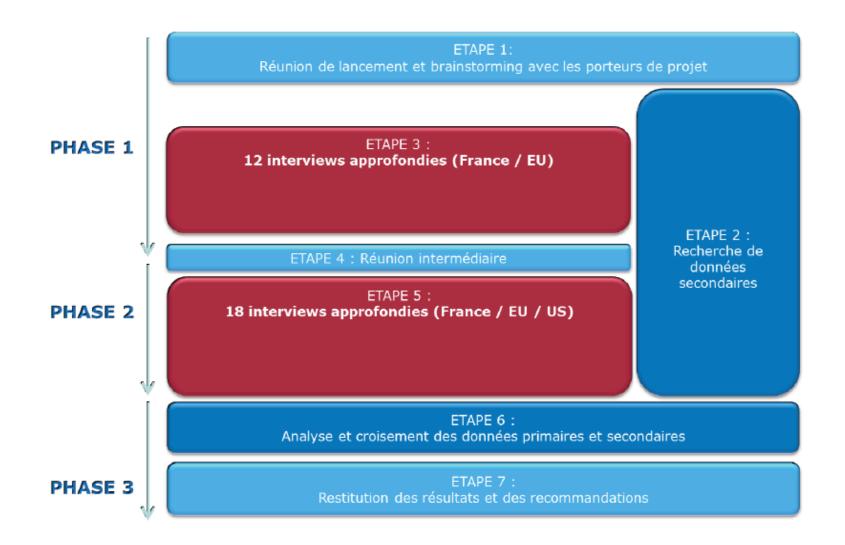








#### FLI-IAM - Market study – project plan







## FLI-IAM – Preparation of phase 2

- Within 2017 we prepare the phase 2
  - Market study in cooperation with The MarkeTech Group (Nantes, California)
  - <u>http://www.themarketechgroup.com/en</u>
  - The first interview phase + intermediary analysis have been finished
  - Timeline:
    - Preparation: target groups + people, interview contents
    - 23.01. 17.02.: Interviews (12)
    - 17.02.: First step synthesis
    - 20.02. 17.03.: Interviews (18)
    - 04.04.: Final synthesis
  - Target groups for interviews:
    - Hospital Informatic managers
    - Academic imaging centers
    - R&D Pharma
    - Radiologists
    - CRO
    - Medical software editors





## FLI-IAM – Roadmap 2017

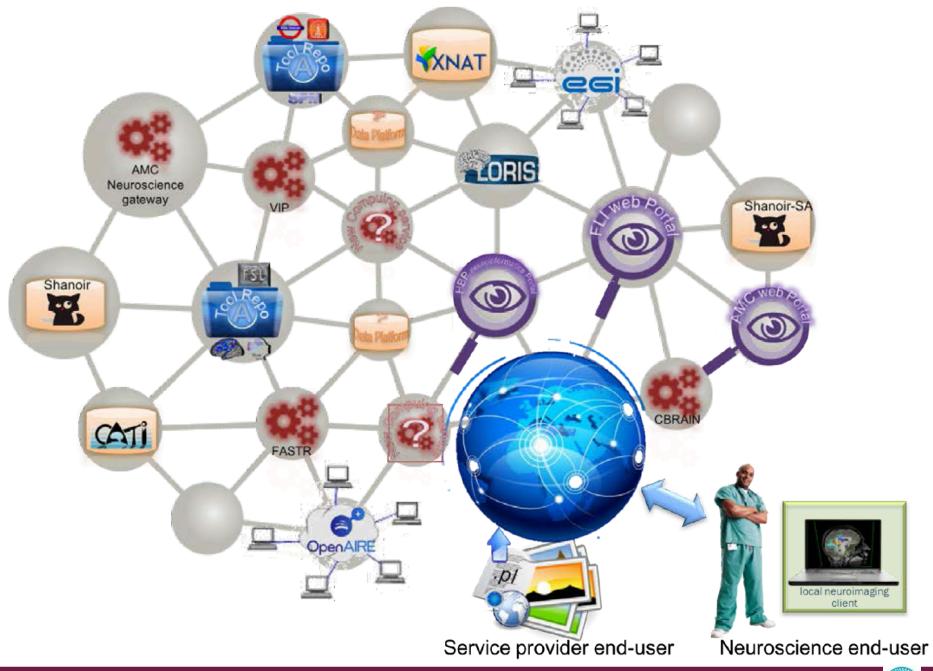
#### • Higher interoperability

- Testing and implementation of CARMIN v0.3 in all involved systems
- Integrate all systems into Renater FedAuth, unified login

#### • End user interface

- App Store in portal
- Simplified and unified data upload
- Unify access to data and pipelines in portal
- Common catalog v3, including XNAT
- Keep alive challenges MICCAI 2016
- Prepare phase 2 and migrate into new structure
- Open science solution: partner to H2020 project: OpenAIRE-connect (https://www.openaire.eu)









## Risks

#### • Local Solutions Interferences

- Each local data center provider develops its own solution
- No compatibility between IAM solutions
- No Sharing

#### International Competition

- COINS (US), LONI (US), CBRAIN (Ca), XNAT (US), HBP-MI (Eu)
- .....
- => WS Miccai 2016 => RT Front in Neurosciences 2017







## Risks

#### Heterogeneous local solutions

- Each local data center provider develops its own solution
- No compatibility between IAM solutions
- No Sharing
- International Competition
  - COINS, LONI (US), CBRAIN (Ca), XNAT (US), HBP-MI (Eu)

#### • Adoption of turnkey solutions from GAFAM, BATX

- Azure .....
- No control from academics





Researchers, journals and funding agencies must work together to identify and implement technical solutions that allow the most effective data sharing without greatly increasing the burden on researchers.

Poldrack and Gorgolewski Nat Neuro 2014

The slow adoption of tools and services such as data repositories are indications that **technology alone cannot change scientists' practices; social and cultural factors must also encourage data sharing.... Much sharing is private rather than public**.

Wallis et al. PLOS One 2013





#### Thank you for your attention

