France Life Imaging

Infrastructure FLI-IAM, example OFSEP

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Workshop in Multiple Sclerosis

Translating engineering innovation into the clinic

30th and 31st January, UCL, London

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

Your service desk for research in medical imaging

France Life Imaging (FLI) - 1

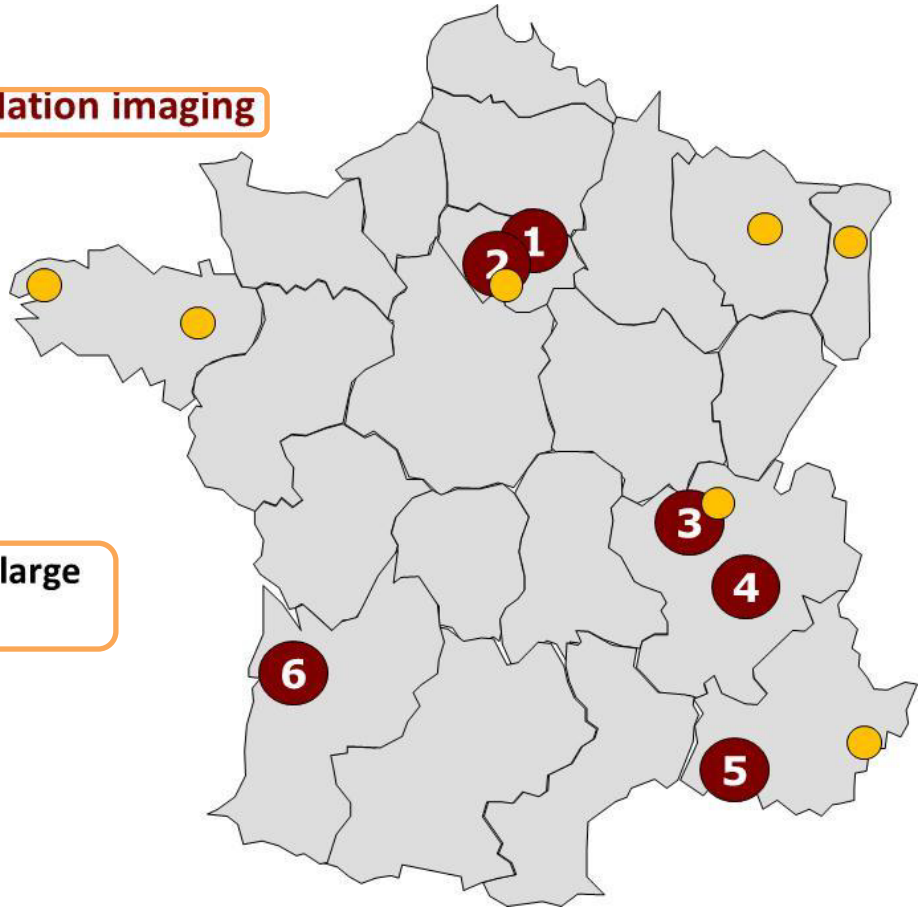
- France Life Imaging (FLI) is a large-scale **research infrastructure project**, aimed at establishing a coordinated and harmonized **network** of biomedical imaging in France
- Its mission is to:
  - **coordinate** nation-wide research activities concerned with in vivo imaging and combine the skills 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
- This project was selected in 2012 by the call "Investissements d'Avenir - Infrastructure en Biologie et Santé"
- 37 million Euros for 8 years
- Nodes (see next slide) and work packages:
  - Molecular Imaging Agents
  - Instrumentations & Innovations Technologiques
  - Imagerie Interventionnelle
  - Traitement et Analyse en Imagerie Multimodale
  - Formation
- http://francelifeimaging.fr

France Life Imaging (FLI) - 2

6 physical nodes

+ 1 transversal node for population imaging

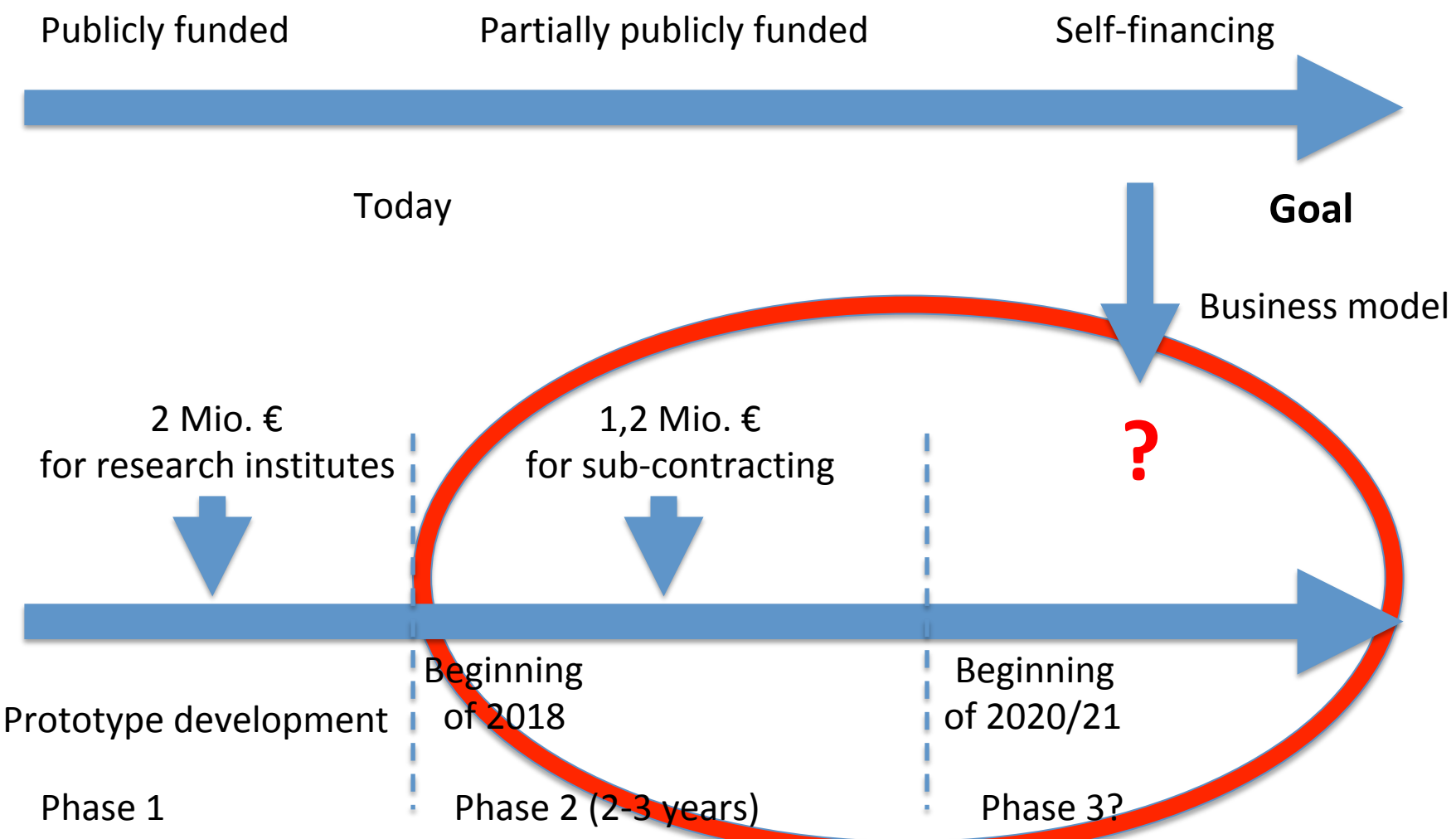
1. Paris Centre
2. Paris Sud
3. Lyon
4. Grenoble
5. Marseille
6. Bordeaux
7. Management and data analyis for large databases / population imaging



Information Analysis and Management (IAM) - 1

- Objectives of the Node: "**Build an in-vivo image management infrastructure**" for
  - **Clinician**: to conduct 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 in medical imaging
  - **Companies and startups:**
  - **Medical imaging community**: to allow experimentation and validation of new innovative medical imaging solutions
- Strengths: based on **existing** high technological expertise and experience
  - From data management solutions: ArchiMed, CATI, SHANOIR, …
  - From medical image processing solutions: BrainVisa, medInria, VIP + Boutiques, …
  - From large national clinical Cohorts: CATI, OFSEP, …
- Multiple research labs involved, around 10
- 3 Work groups: "Interoperability and data management", "Processing and workflow" and "Preclinical imaging"
- https://portal.fli-iam.irisa.fr/services

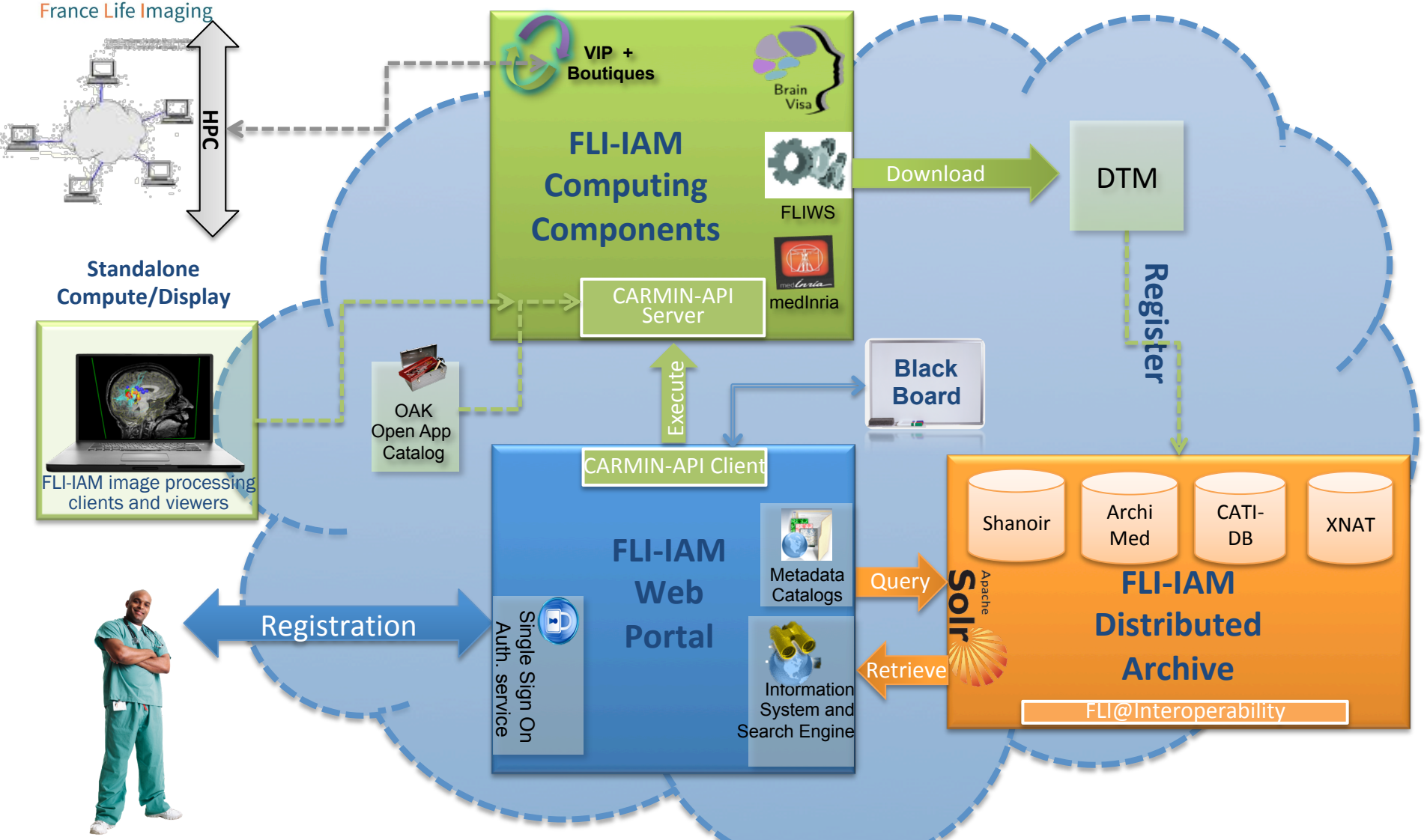
Phases of FLI-IAM - 1



Phases of FLI-IAM - 2

- Main operator: most probably within the Foundation Inria
- Progress with partners to propose higher level services
- On databases or pipelines level (or both)
- Internal partners:
  - CATI: met, agreement defined, nothing contracted yet
  - CICIT: met, agreement defined, nothing contracted yet
  - ICUBE: to meet for their pipelines
  - GIN, Bordeaux + Fealinx (company): met, agreement defined, nothing contracted yet
  - VIP: to meet, but in generally closest cooperation
  - VISAGES: home play
- „External" partners:
  - SFR: met, agreement specified, waiting for feedback
  - CERF: met, agreement specified, nothing contracted yet
  - PIXYL (company): open for pipeline exposal
- Open pricing discussion to make

FLI-IAM Architecture



Interoperability - 1

- FAIR principles: findable, accessible, interoperable, re-usable
- We believe that the long-time lifetime of today software systems are defined by the interoperability between the systems and their environment
- Plays between the following standards/formats (and more):
  - DICOM (Digital Imaging and Communications in Medicine) and PACS (Picture Archiving and Communication System)
  - DICOM De-identification, Pseudonymization and Anonymization
  - DICOMWeb: WADO-URI, -WS or -RS, QIDO-RS, STOW-RS
  - NIfTI (Neuroimaging Informatics Technology Initiative)
  - NRRD (Nearly Raw Raster Data)
  - XDS (Cross-Enterprise Document Sharing)
  - HL7 CDA (Clinical Document Architecture)
  - HL7 FHIR (Fast Healthcare Interoperability Resources)
  - BIDS (Brain Imaging Data Structure)
  - NIDM (The Neuroimaging Data Model)
  - Medical Health Record (DMP, EHR, PHR, openEHR)

Interoperability - 2

- Within the following legal environments:
  - France:
    - CNIL, e.g. Agrément d'hébergement de données de santé (ou « agrément HDS »)
    - ANSM
  - Europe:
    - GDPR (General Data Protection Regulation), applies on 25. May 2018
  - USA:
    - HIPAA (Health Insurance Portability and Accountability Act)
    - Title 21 CFR Part 11 by FDA
- Work started on that road:
  - Common catalog, unified meta-data search index over all image databases
  - Unified access to processing platforms: CARMIN-API
  - OAK: open app catalog for processing applications of medical images
  - VIP + Boutiques: exchange/execute pipelines encapsulated in Docker images (local/cluster)
- Still a very long way to go:
  - Traceability of access to data and systems
  - Assure security on the most high level
  - Open and unified access for (commercial) viewers, e.g. Osirix, to databases in FLI-IAM
  - Integrate all databases compatible with ShanoirUploader and name to FLI-IAM Uploader
  - Unified data exchange between research databases

Future

- We did a market study (TMTG) at the beginning of 2017
- Organization of phase 2
  - How will FLI-IAM be structured?
    - As structure itself, and in relation to FLI, phase 2 (in validation)
    - Partners, research and industrial (ongoing exchanges)
    - Potential service customers (ongoing presentations)
  - Order of services to propose?
    - First service offer to start: Shanoir Small Animal
    - What else after?
- Some of the next steps to prepare:
  - More interoperability!!!
  - Agrément d'hébergement de données de santé (ou « agrément HDS »)
  - Service for clinical research studies: hosting of electronic health records
  - Project OpenAIRE: integrate open science directly:
    - DOI (digital object identifier) managment within databases and processing platforms within FLI-IAM
- Any ideas or proposals: please contact me ☺