

Sharing Data and Image Processing Pipelines: The Information Analysis & Management initiative

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Sharing Data and Image Processing Pipelines: The Information Analysis & Management initiative

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E-Poster

Introduction:

The Information Analysis and Management (FLI-IAM) initiative, supported by the France Life Imaging national project in France (ANR-11-INBS-006), is designed to promote data management and information processing support for population imaging. The aim is to provide an infrastructure (hardware and software), accessible to in-vivo imaging users, composed of software components to store, manage and process large clinical and preclinical in vivo imaging datasets and their associated metadata. The purpose of the first stage of the project (2013-2016) is to build image analysis and data management components allowing the interoperability between heterogeneous and distributed storage solutions implementing raw and meta-data indexing, through the use of semantic models or ontologies. Three existing solutions were selected for data management: Cati-DB (Paris-Sud, FR), Shanoir (Rennes, FR) and Archimed (Nancy, FR), and three image processing management solutions: VIP (CNRS, Lyon), BrainVisa (CEA Paris Sud, FR) and MedInria (Inria, FR). All of these components are currently ready to action. In a second stage, after 2016, we will be working towards the exploitation of our interoperability layer.

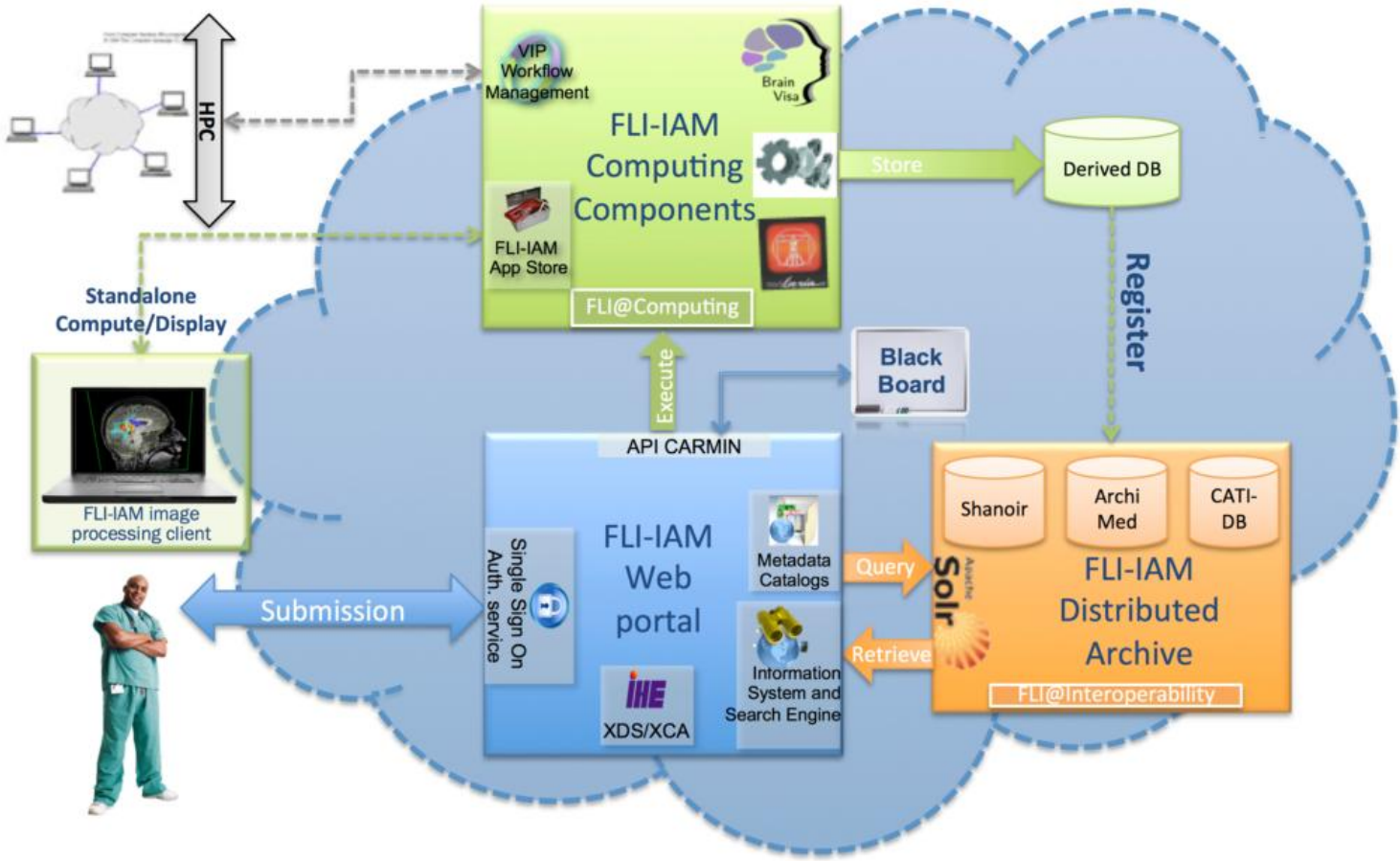
Methods:

After a survey of the end-users needs, from physicists to clinicians, we defined three scenarios for using our infrastructure: 1) Software as a Service (SaaS) for clinical and preclinical distributed research, where the user searches either for an outsourcing solution (turnkey service) or an hosting-type service, in which mono or multi-center datasets are controlled, stored and processed following users specifications and final results can be provided (typical users: clinician or PI of a cohort study), 2) Platform as a Service (PaaS) i.e. an open resource for professionals that provides housing of data (DaasS) and processing pipelines solutions defined for the needs of a large and open community of users (typical users: organizer of image processing challenges, PI aiming to disseminate collected data) and 3) Storage and Computing as a service (SCaaS) i.e. basic cloud hosting solutions for storage, processing and exchange (typical users: researcher for data management with a small group of collaborators).

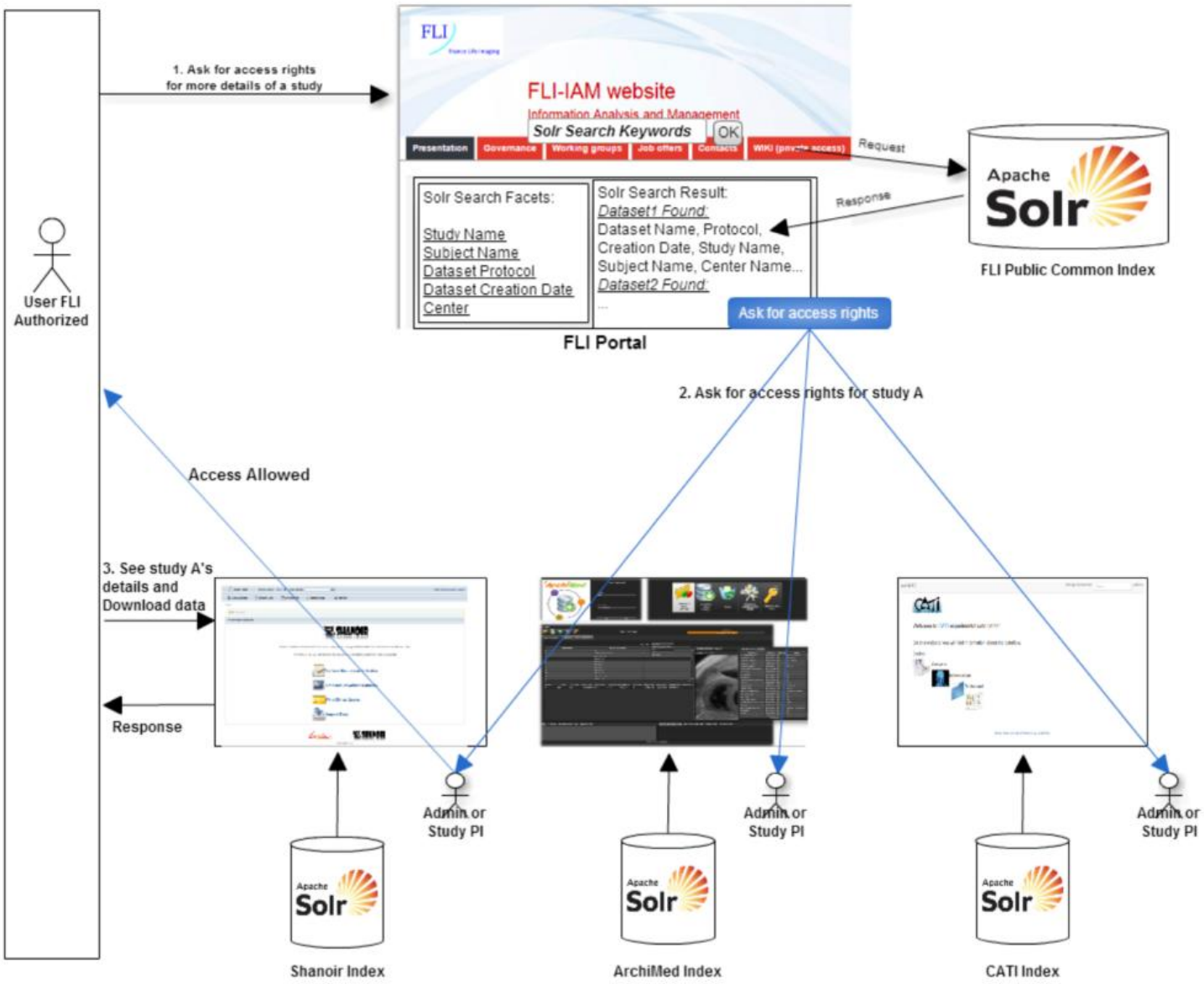
Results:

The three described scenarios are supported by the architecture developed (see Figure 1). Collaborative engineering work has been performed to ensure interoperability between Shanoir, Cati-DB, and Archimed databases on the one hand, and VIP, BrainVisa and MedInria on the other hand. OntoNeurolog [Batrancourt 2015, Temal 2008] and OntoCati [Edward 2013] ontologies used in Shanoir and Cati-DB respectively for Human neuroimaging data have been aligned and extended to deal with preclinical imaging data as well. Dedicated workflows (e.g. automatic sulci segmentation in T1-weighted human structural images, or T1 and T2 parametric maps for mouse brains) can be executed locally (via BrainVisa or MedInria) or on distributed architectures (VIP [Glatard 2013] or CATI capsul). Access to high performance computing (HPC, i.e.) is then facilitated. The IAM web portal (see Figure 2) proposes a common public meta-data catalogue to assess the different repositories federated through Apache Solr. A Common API for Research Medical Imaging Network

(CARMIN) [Glatard 2015] is used for pipeline execution on the web that allows a greater integration between image data repositories and image processing workflows for both Push and Pull data streams.



·Figure 1: FLI-IAM architecture for data storage and image processing pipelines definition and execution



·Figure 2: FLI-IAM portal for end-users assess to the three neuroimaging repositories via a common data catalog.

Conclusions:

FLI-IAM, built over ready to use software components,, offers a unique architecture for sharing data and image processing pipelines with local or distributed execution. We are involved in several actions for sharing expertise in complementary domains and to define interoperability with other existing platforms (e.g. NSG, CBRAIN, LORIS or XNAT).

Informatics:

Databasing and Data Sharing [1]
Workflows [2]

Poster Session:

Poster Session - Tuesday

Keywords:

Computing
Data Organization
Informatics
Workflows

[1|2]Indicates the priority used for review

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