

Ontology reuse, from OntoNeuroLOG to OntoCATI



Bénédicte BATRANCOURT, INSERM/ Pitié-Salpêtrière Hospital
Sylvain Poret, Lydie Edward, UPMC
Yann Cointepas, Neurospin, CEA

Outlines

- What is the CATI ? Historic, partners and governance
- Data flow and Neuroinformatics CATI architecture
- CATISchema
- OntoCATI

What is the
CATI ?
Historic,
partners and
governance

CATI is a french national platform

- **CATI = Centre d'Acquisition et de Traitement des Images**
- **CATI = Center for Image Acquisition and Processing**
- **ACTION 28 - National Alzheimer Action Plan 2008-2012**

The CATI is a national platform built into the framework of the National Alzheimer plan.

CATI must promote the image using into the research projects and therapeutic trials among the alzheimer disease.

Financial support



Fondation de coopération scientifique
Maladie d'Alzheimer et maladies apparentées

*French National Foundation
on Alzheimer's Disease and related disorders*

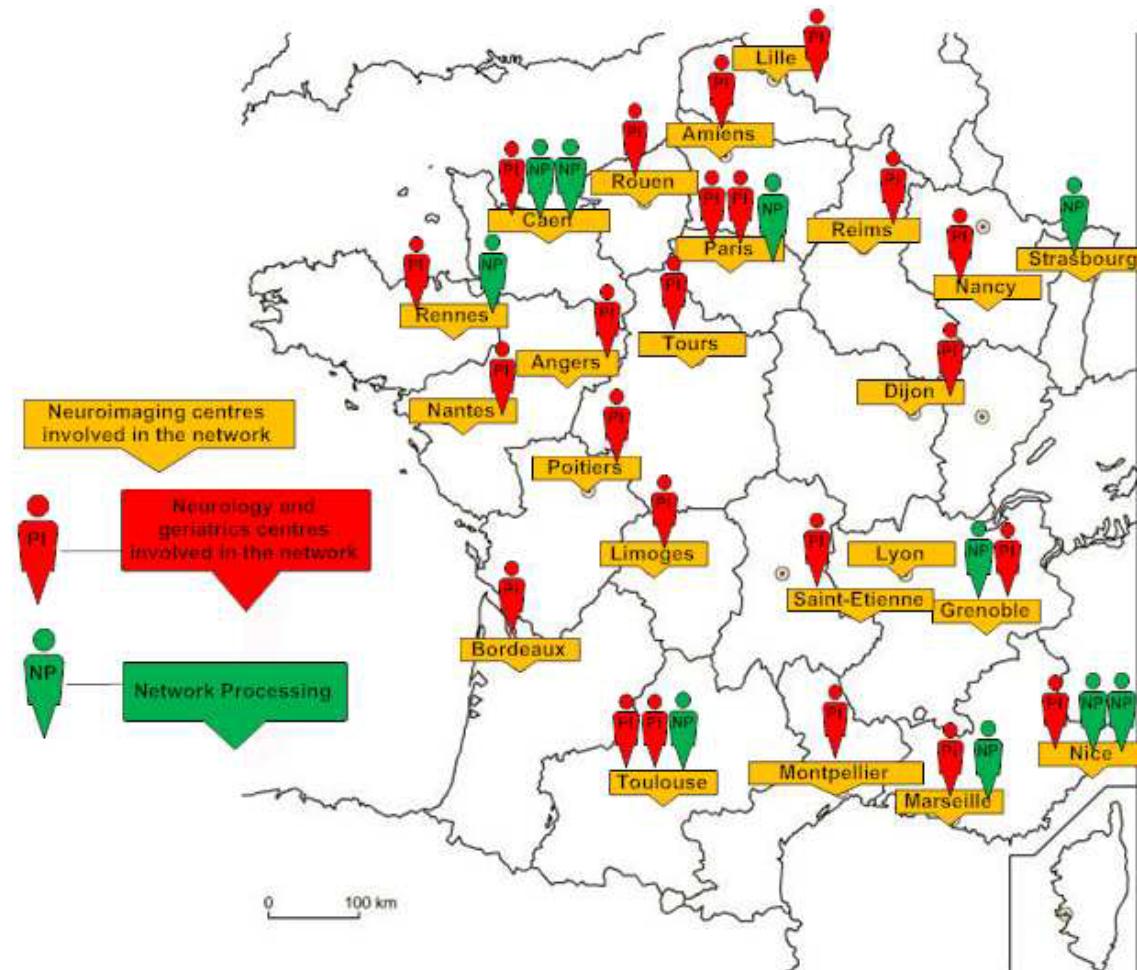
CREATION D'UN CENTRE EXPERT DE TRAITEMENT
ET D'ACQUISITION D'IMAGES

*CREATION OF AN EXPERT CENTRE
IN ROUTINE ACQUISITION AND IMAGE PROCESSING*

CATI Partners

- **Pitié-Salpêtrière Hospital (Clinical and research Alzheimer expertise)**
 - Especially Pr. Bruno Dubois IM2A : Insitute for Memory and Alzheimer Disease
 - AP-HP (Assistance Publique et Hôpitaux de Paris)
 - Research teams : INSERM/ CNRS/UPMC
 - ICM : Institut Cerveau Moelle
- **CEA/Neuropsin (Image processing expertise)**
- **National network Images Provider : MRI & PET**
 - 25 Centers

Neuroimaging Centres involving in the network



CATI is a service platform +++

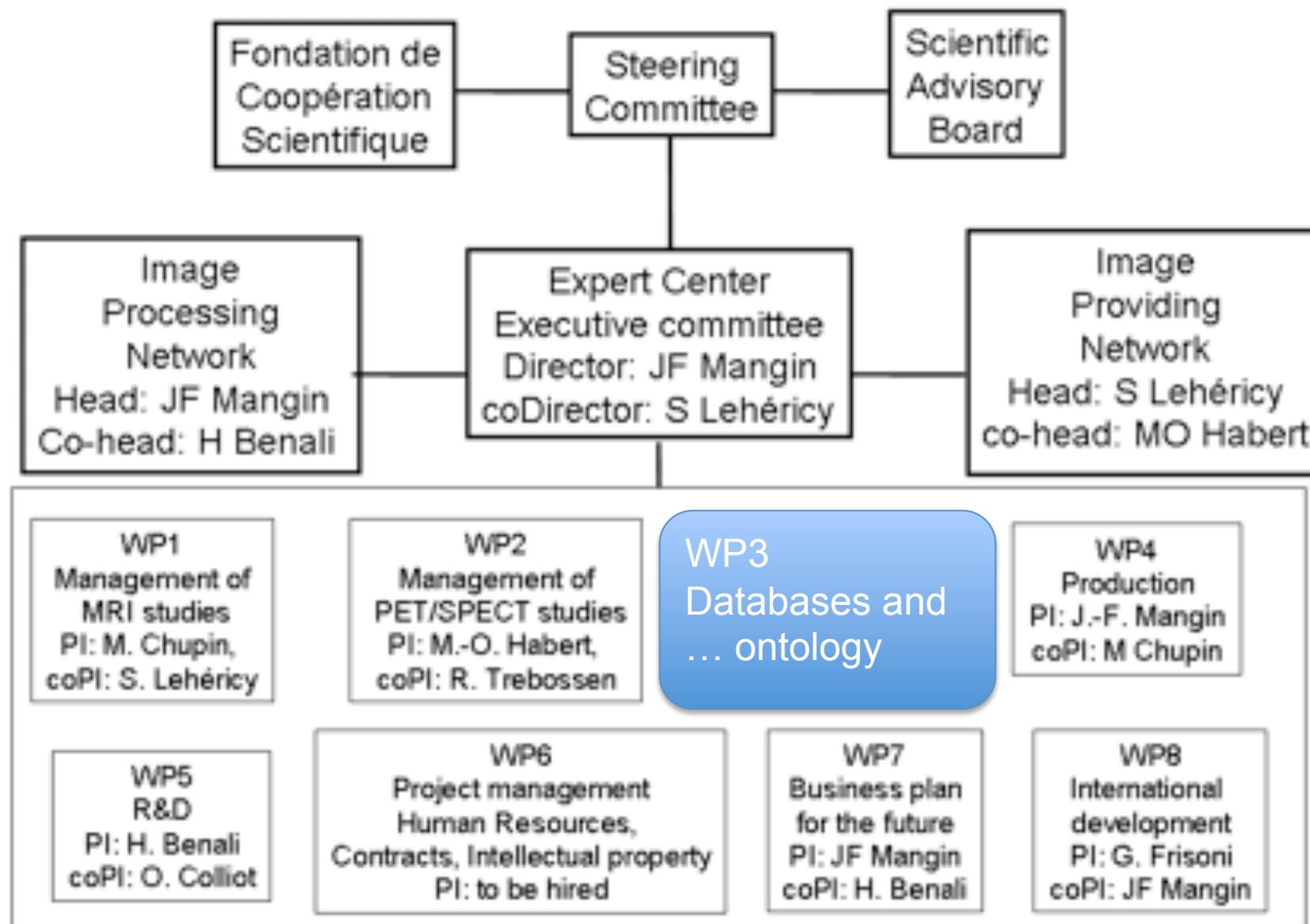
From data acquisition to data analysis

- **We must provide a service to the community :**
 - Define the acquisition protocol MRI & PET
 - Store and structure the datasets
 - Quality check and Sanity Check control on the images data
 - Image processing
 - And at least => propose anatomo-functional, clinical structure correlation hypothesis about the study among the cohort of patients (e.g. The volume of the hippocamp structure and the score obtained in the Gröber & Buschke Test Memory which measures the episodic long term and short term memory).
- **CATI have to be financially self-sufficient in 5 years**
 - We have to define a catalog of services and associated costs

The first CATI study

- **ACTION 27 – MEMENTO – National cohort**
 - n= 2000 patients
 - 3 Visits : Month 0, Month 24, Month 36
 - MRI & PET & Neuropsychological data (only images are given to CATI)
 - Subjects with a memory impairment – Pre-symptomatic patients (i.e. MCI = Mild Cognitive Impairment)
 - PI = BORDEAUX Center
- **The first job of the CATI is to support the MEMENTO cohort**

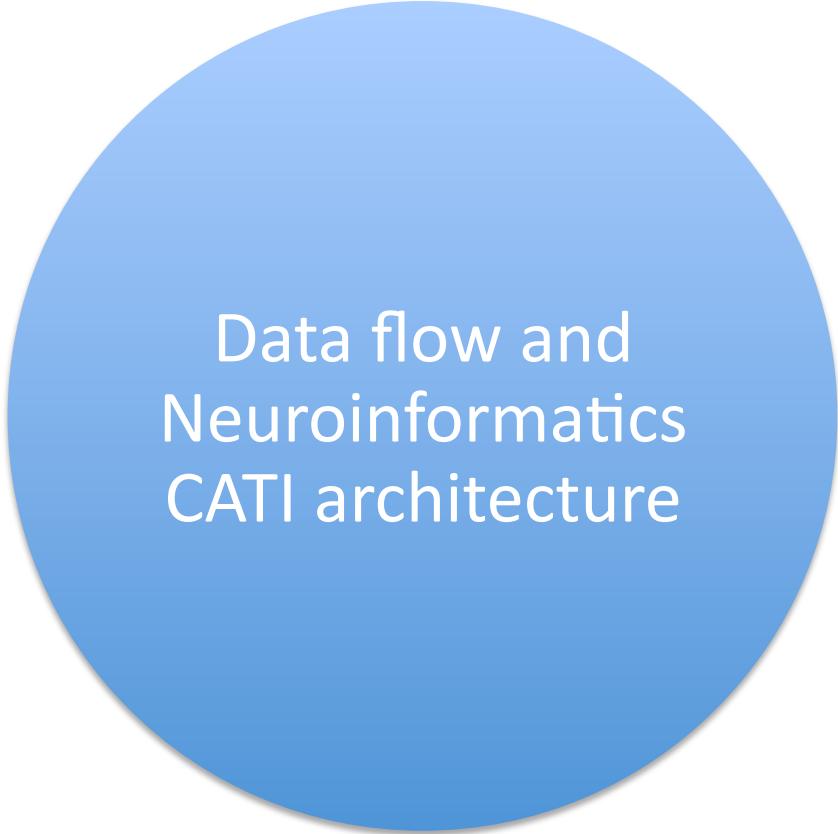
Consortium Governance



Questions

- **Do we really need an ontology ?**
 - There is not a consensus about this question in the whole team.
- Is an ontology useful in the context of the CATI project ?
- Corollaries questions :
 - What is an ontology ? (The clinicians)
 - Is a schema could be sufficient ?(Computers scientists used to store datasets into hierarchical directories)
 - Today we know MEMENTO Study and its parameters and context but we don't know the following studies

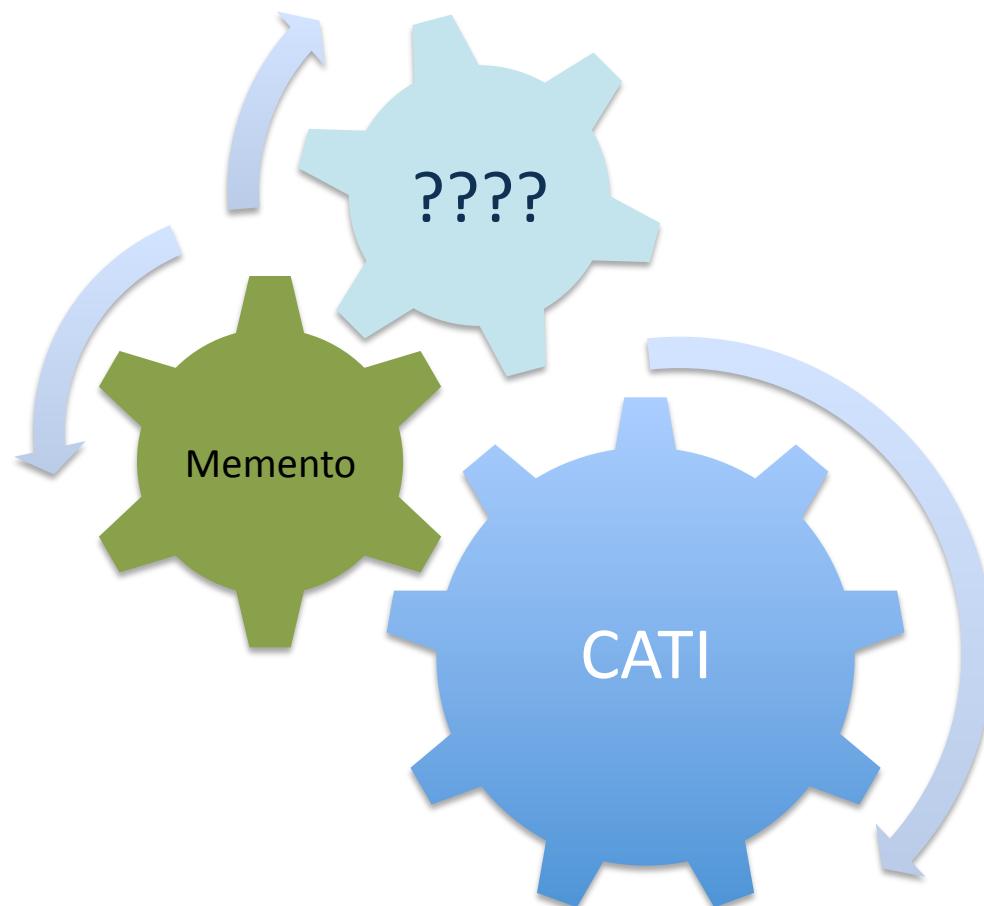
Outlines

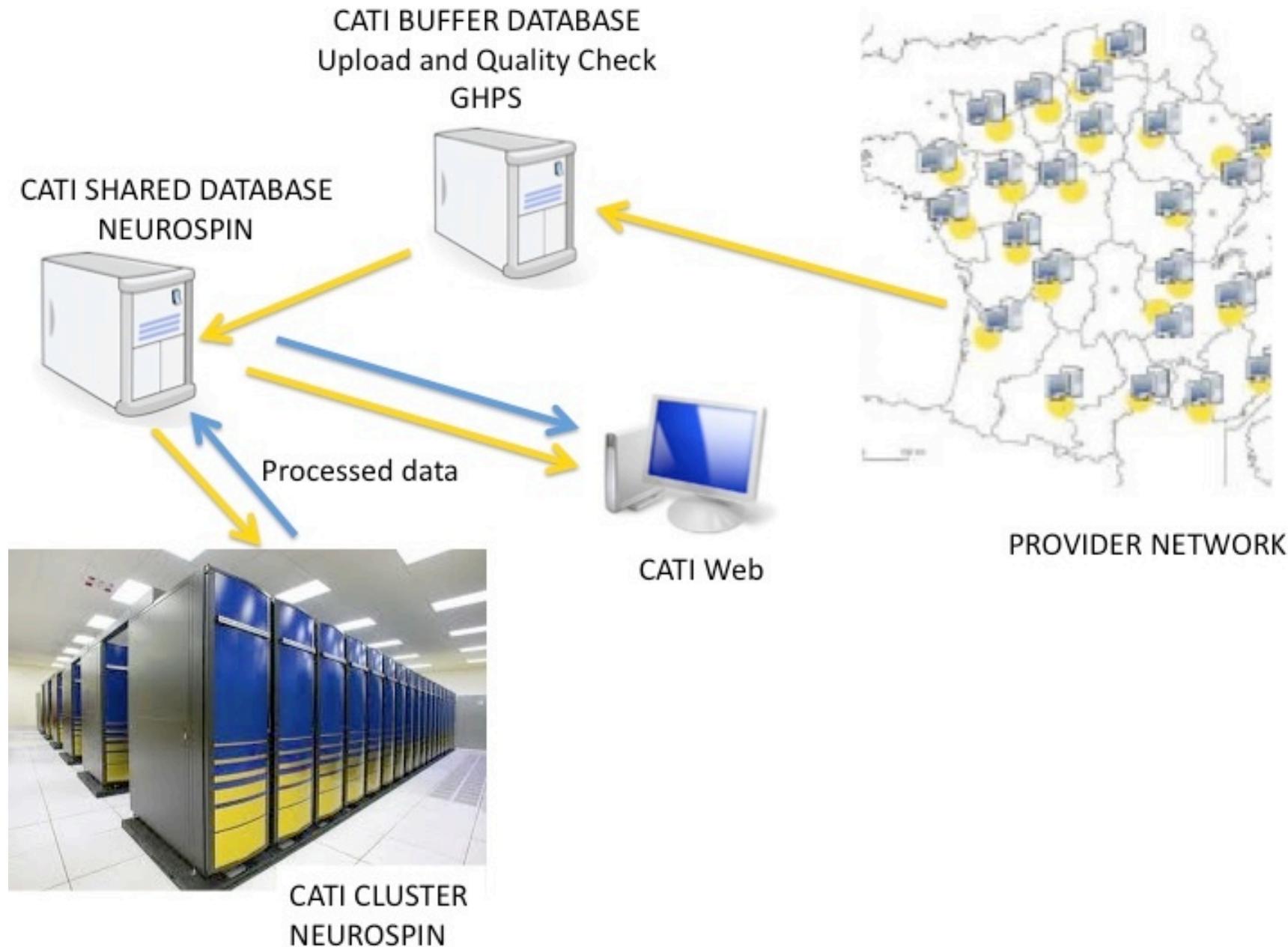


Data flow and
Neuroinformatics
CATI architecture

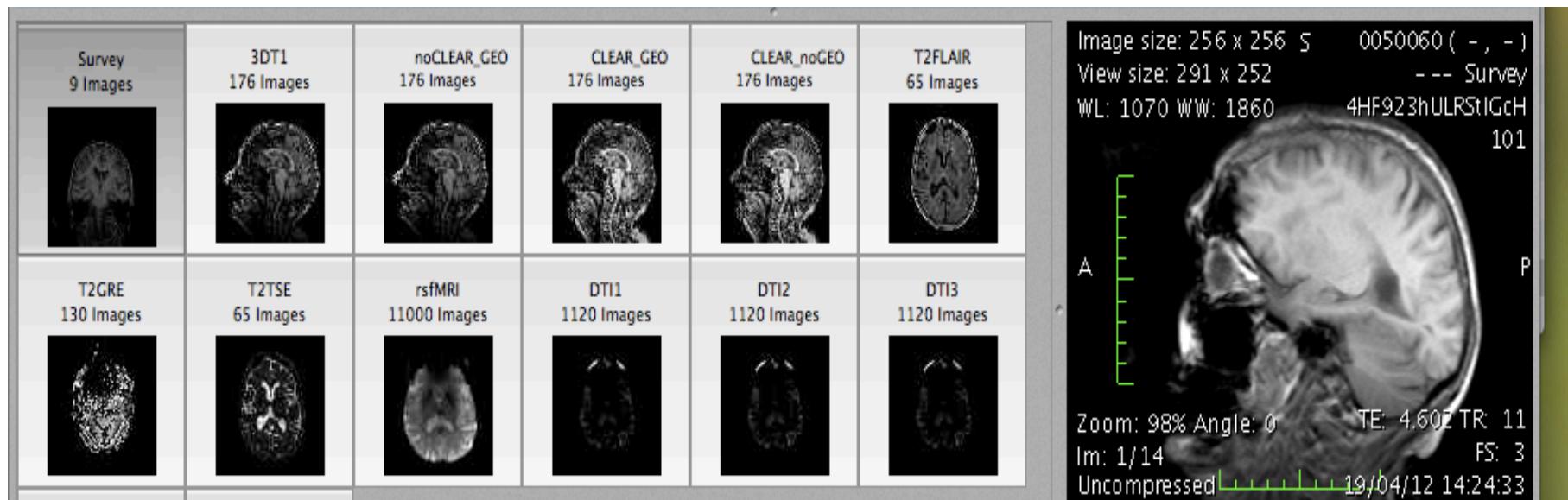
A robust and adaptable architecture ...

Today we know our first « client » but not the following ...





MRI CATI MEMENTO Protocol



File View Other

Help



Slice Number

97

Load As...

Load Volume

Database: sqlite3:db1:/Users/bbatrancourt/Desktop/MEMENTO/MEMENTO.adb

Update Status

Uptodate

Remote AET: PacsOne:PacsOne:birdicom:1234

Patient Name	Patient ID	Birth Date	Gender	Study ID	Study Date	Time	Modality	Referring Phys	Desc
0271_MEMENTO_005008_BUJU	0271	Apr 09, 1935	M	362582901	June 30, 2011	13:28:22	MR		NA
0290_MEMENTO_005_0014_PRMI	0290	Oct 31, 1942	F						
0050014	0050014								
COMUNIX	FYET5.0	Sep 01, 1941	O						

Series ...	Volume ID	Image Count	Width	Height	Orientation	Description
101	1	3	256	256	Coronal	Survey
101	2	3	256	256	Sagittal	Survey
101	3	3	256	256	Axial	Survey
301	1	176	256	256	Sagittal	anatomy_t1_1mm
303	1	176	256	256	Sagittal	REC clear Y
304	1	176	256	256	Sagittal	REC GEO NONE
401	1	35	240	240	Axial	t2_flair_2d
501	1	35	240	240	Axial	t2_gre_2d
601	1	35	240	240	Axial	t2_tse_2d
701	1	42	64	64	Axial	resting_state_fmri

-- Table

`CATI_V1.13`.`Sequence_Name`

`NAME` VARCHAR(45)

Survey

3DT1

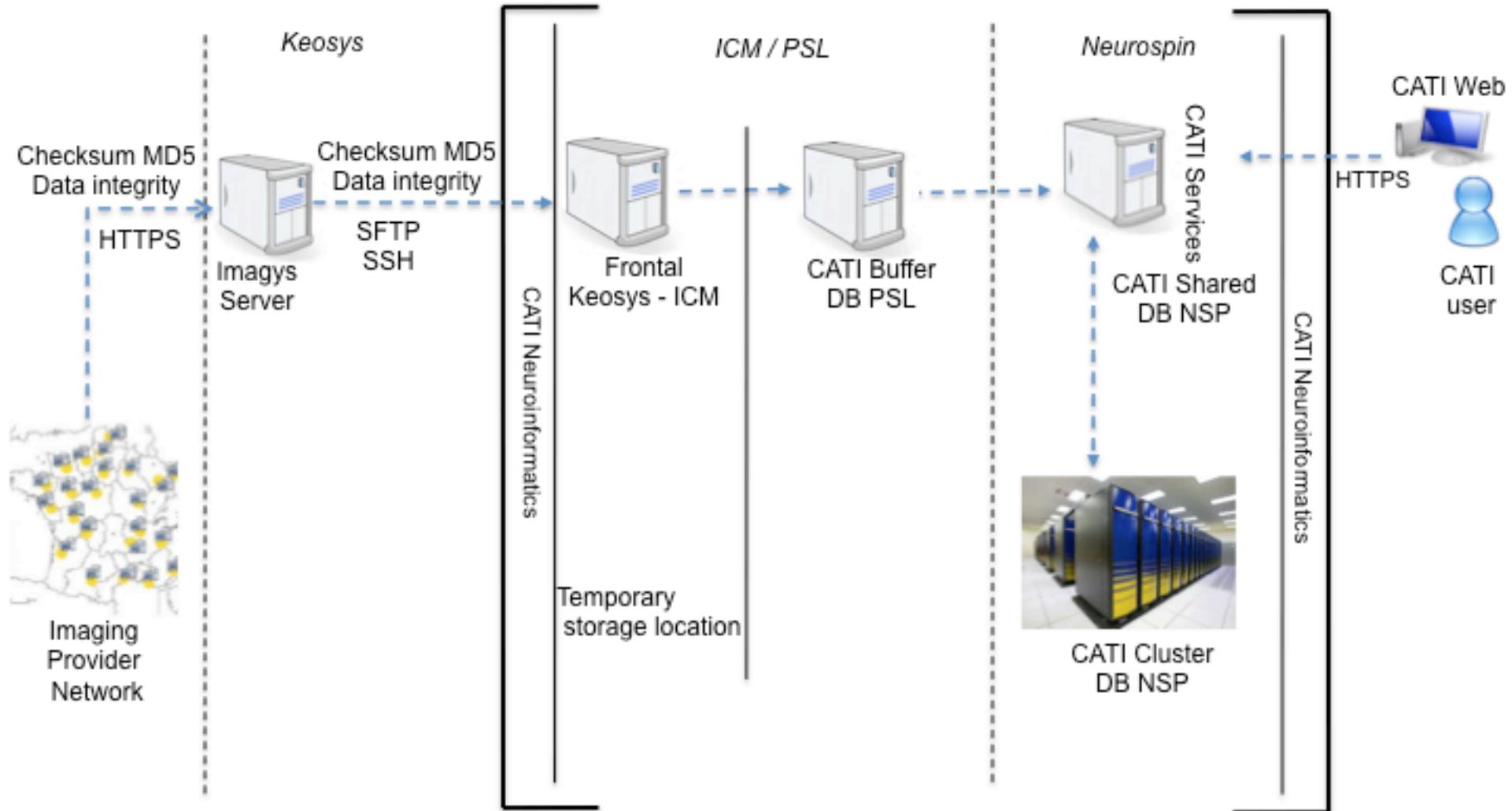
T2FLAIR, T2GRE, T2GREph , T2TSE

IRMf

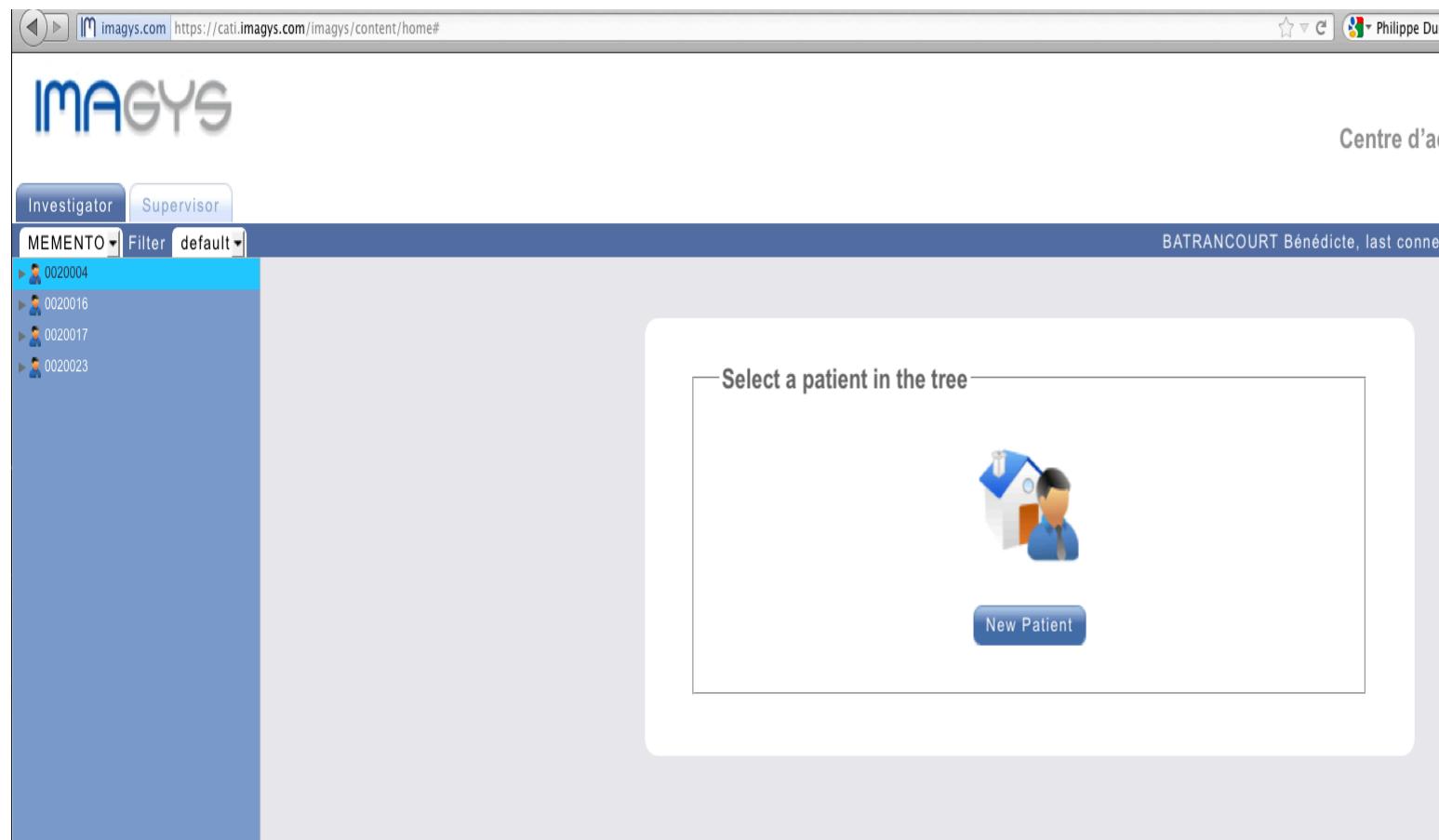
DTI1, DTI2, DTI3, DTI4,

B0MAP, B0MAPph, ASLperf, SWI, ASLfonctionnel,

PatientProtocol, TEP, CT, SPECT



Keosys / Upload the data from the Centres



Keosys / Imagys Web Platform

The screenshot displays two main windows of the Keosys / Imagys Web Platform.

Left Window (Patient List):

- Header: Investigator, Supervisor
- Search: MEMENTO (dropdown), Filter, default (dropdown)
- List:
 - 0020004
 - 0020016
 - 0020017
 - 0020023

Right Window (New Patient Form):

- Header: New Patient
- Form fields:
 - Code: [input field]
 - Patient initial (4 chars): [input field]
 - Patient sex: Female [dropdown]
 - Patient age (3 digits): [input field]
- Buttons: Create, Cancel

Bottom Left Window (Patient Information):

- Header: Investigator, Supervisor
- Search: MEMENTO (dropdown), Filter, default (dropdown)
- List:
 - 0020004
 - 0020016
 - 0020017
 - 0020023
- Details for patient 0020004:

Patient information	
Code	0020004
Patient initial (4 chars) :	BBBB
Patient sex :	Female
Patient age (3 digits) :	076
- Visit list:

Visit list	
Code	Add to basket
M000	<input type="checkbox"/>
	Add
- Buttons: New Visit

Imagys Supervisor view

IMAGYS

Investigator Supervisor

MEMENTO BAT

Visits/Series Audit trailer Export

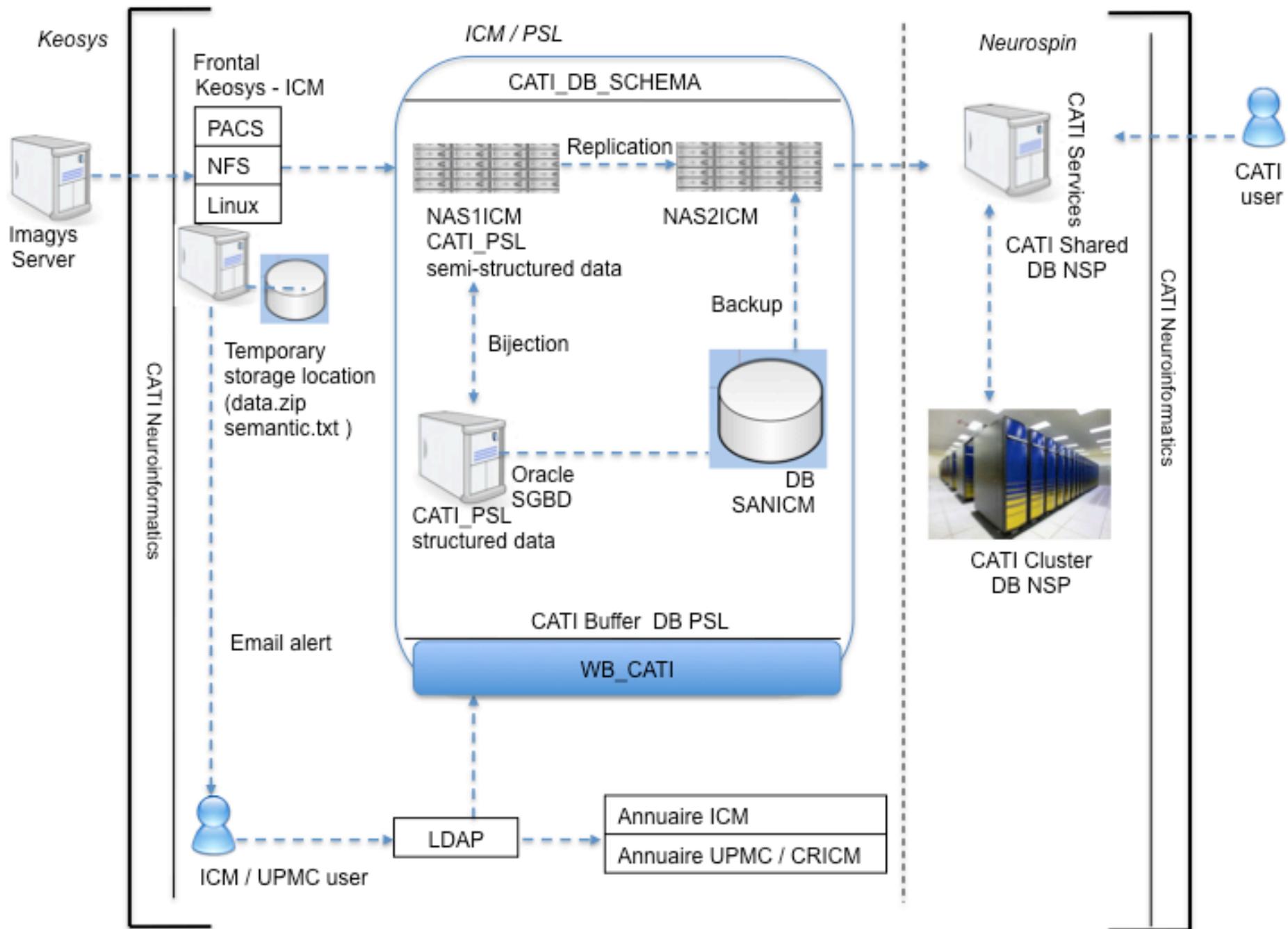
All

From : To: filter

Patient	Visit	Upload	Status	Details
0050034	M000	2012/02/15 14:11	Completed	details
0050033	M000	2012/02/15 11:48	Completed	details
0050032	M000	2012/02/14 15:17	Completed	details
0050031	M000	2012/02/10 11:35	Completed	details
0050029	M000	2012/02/02 13:39	Completed	details
0050028	M000	2012/02/02 13:04	Completed	details
0050027	M000	2012/02/02 11:52	Completed	details
0050026	M000	2012/01/27 10:55	Completed	details
0050025	M000	2012/01/26 14:54	Completed	details
0050024	M000	2012/01/26 12:57	Completed	details
0050023	M000	2012/01/26 14:35	Completed	details
0050022	M000	2012/01/26 15:26	Completed	details
0050021	M000	2012/01/27 15:38	Completed	details

Keosys Anonymisation De-Indentification and Re-Identification

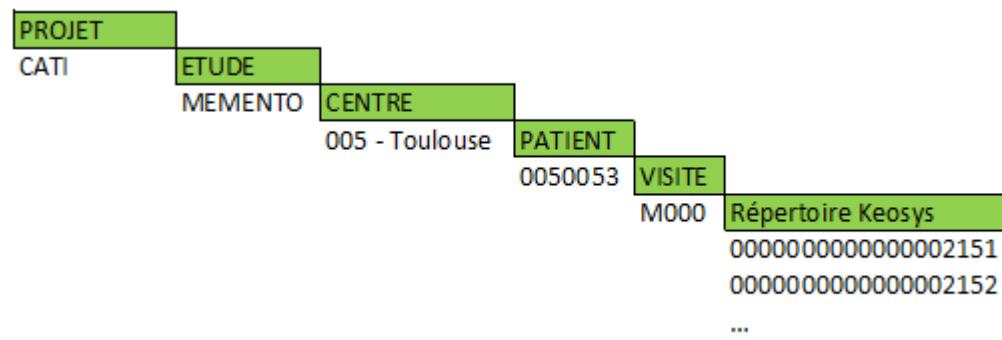
Attribute Name	(Dicom Tag)
Patient's Birth Date	(0010,0030)
Patient's Birth Time	(0010,0032)
Patient's Sex	(0010,0040)
Other Patient Ids	(0010,1000)
Other Patient Names	(0010,1001)
Patient's Age	(0010,1010)
Patient's Size	(0010,1020)
Patient's Weight	(0010,1030)
Medical Record Locator	(0010,1090)
Ethnic Group	(0010,2160)
Occupation	(0010,2180)
Additional Patient's History	(0010,21B0)
Patient Comments	(0010,4000)
Device Serial Number	(0018,1000)
Protocol Name	(0018,1030)
Study Instance UID	(0020,000D)
Series Instance UID	(0020,000E)
Study ID	(0020,0010)
Frame of Reference UID	(0020,0052)
Synchronization Frame of Reference UID	(0020,0200)
Image Comments	(0020,4000)
Request Attributes Sequence	(0040,0275)
UID	(0040,A124)
Content Sequence	(0040,A730)
Storage Media File-set UID	(0088,0140)
Referenced Frame of Reference UID	(3006,0024)
Related Frame of Reference UID	(3006,00C2)



Distributed platform on two sites :
Hôpital Pitié-Salpêtrière (ICM)
Neurospin (CEA).

CATI BUFFER (ICM) centralises the MRI and PET images. Following the quality control check operations, images are transferred to CATI SHARED and CATI CLUSTER (Neurospin) for exploitation.

NAS CATI



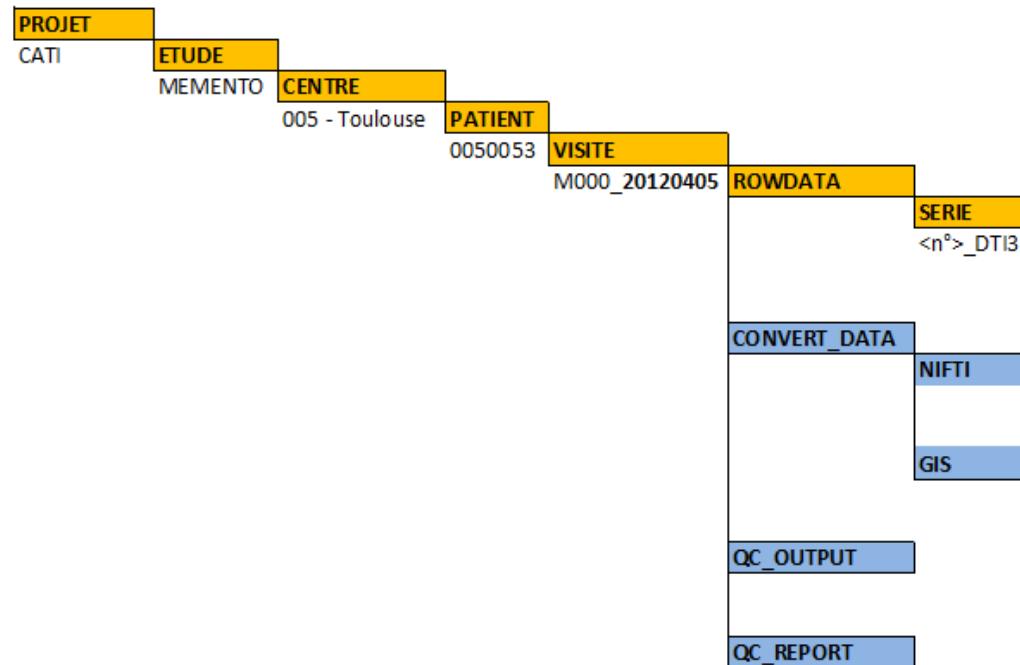
- Date : 05/10/2012
- Volumétrie NAS CATI :
 - Taille sur le disque : 163 Go (*précédemment : 155 Go*)
 - Nombre fichiers : 1 577 240 (*précédemment : 1 515 309*)
 - Nombre de répertoires : 4 075 (*précédemment : 3 917*)
- Requêtes CATI Oracle :
 - Nombre études : 1
 - Memento_IRM
 - Nombre centres : 15(*précédemment 14*)
 - 001-CHUBORDEAUX
 - 1 visite, dernier ajout le 22/02/2012
 - 002-CHULILLE
 - 2 visites, dernier ajout le 10/02/2012
 - 003-CHUMARSEILLE
 - 16 visites, dernier ajout le 01/09/2012
 - 005-CHUTOULOUSE
 - 69 visites, dernier ajout le 04/10/2012
 - 011-CHUBREST
 - 3 visites, dernier ajout le 21/09/2012
 - 013-CHUDIJON
 - 14 visites, dernier ajout le 27/09/2012
 - 014-CHUDIJON
 - 3 visites, dernier ajout le 29/09/2012
 - 015-CHUGRENOBLE
 - 7 visites, dernier ajout le 11/07/2012
 - 016-HOSPICESCIVILSDELYON
 - 23 visites, dernier ajout le 21/09/2012
 - 019-CHUNICE
 - 11 visites, dernier ajout le 03/10/2012
 - 023-CHUROUEN (*nouveau*)
 - 1 visite, dernier ajout le 29/09/2012
 - 024-CHUSAINT-ETIENNE
 - 9 visites, dernier ajout le 18/09/2012
 - 025-CHUSAINT-ETIENNE
 - 13 visites, dernier ajout le 30/08/2012
 - 026-CHUSTRASBOURG
 - 14 visites, dernier ajout le 04/10/2012
 - 029-CHUDECLERMONT-FERRAND
 - 4 visites, dernier ajout le 26/09/2012
 - Nombre sujets : 189 (*précédemment : 182*)
 - Nombres visites : 190 (*précédemment : 183*)

NAS HIERARCHY / CATI BUFFER

Name	Date Modified	Size	Kind
001-CHUBORDEAUX	Feb 22, 2012, 1:54 PM	--	Folder
002-CHULILLE	Feb 10, 2012, 3:34 PM	--	Folder
003-CHUMARSELLE	Sep 1, 2012, 12:35 PM	--	Folder
005-CHUTOULOUSE	Yesterday, 8:57 PM	--	Folder
011-CHUBREST	Sep 21, 2012, 10:01 AM	--	Folder
013-CHUDUJON	Sep 27, 2012, 10:05 AM	--	Folder
014-CHUDUJON	Sep 29, 2012, 10:37 AM	--	Folder
015-CHUGRENOLBE	Jul 11, 2012, 10:49 PM	--	Folder
016-HOSPICESCIVILSDELYON	Sep 21, 2012, 6:09 PM	--	Folder
019-CHUNICE	Yesterday, 10:01 AM	--	Folder
023-CHUROUEN	Sep 29, 2012, 10:04 AM	--	Folder
024-CHUSAINT-ETIENNE	Sep 18, 2012, 10:17 PM	--	Folder
025-CHUSAINT-ETIENNE	Aug 30, 2012, 1:17 PM	--	Folder
026-CHUSTRASBOURG	Sep 28, 2012, 1:13 PM	--	Folder
0260001	Mar 7, 2012, 2:58 PM	--	Folder
0260002	Mar 10, 2012, 2:26 AM	--	Folder
0260003	Mar 10, 2012, 5:30 AM	--	Folder
0260004	Mar 20, 2012, 10:22 AM	--	Folder
0260006	Mar 30, 2012, 10:05 AM	--	Folder
0260007	Mar 30, 2012, 12:54 PM	--	Folder
0260028_SEMA	Sep 28, 2012, 10:02 AM	--	Folder
M000_20120926	Sep 28, 2012, 1:06 PM	--	Folder
01234567-2012092...0000000000012178	Sep 28, 2012, 10:02 AM	--	Folder
01234567-2012092...0000000000012179	Sep 28, 2012, 10:06 AM	--	Folder
01234567-2012092...0000000000012180	Sep 28, 2012, 10:08 AM	--	Folder
01234567-2012092...0000000000012181	Sep 28, 2012, 10:40 AM	--	Folder
01234567-2012092...0000000000012182	Sep 28, 2012, 10:44 AM	--	Folder
01234567-2012092...0000000000012183	Sep 28, 2012, 11:11 AM	--	Folder
01234567-2012092...0000000000012184	Sep 28, 2012, 11:43 AM	--	Folder
01234567-2012092...0000000000012185	Sep 28, 2012, 11:47 AM	--	Folder
01234567-2012092...0000000000012186	Sep 28, 2012, 11:50 AM	--	Folder
01234567-2012092...0000000000012187	Sep 28, 2012, 11:53 AM	--	Folder
01234567-2012092...0000000000012188	Sep 28, 2012, 11:55 AM	--	Folder

53 items. 1.023.82 TB available.

NAS CATI / Converted data



CATI BUFFER (ICM/Pitié-Salpêtrière Hospital)

- **2 ressources :**
- **NAS (semi-structured data, DICOM images)**
- **Oracle database describing, indexing the images.**
- **To federate the differents databases implied into the CATI flow, we develop :**
 - A schema **CATISchema**
 - An ontology (**OntoCATI**) covering
 - Studies
 - Datasets
 - Quality control
 - Image processin les traitements d'images, les flux de données et leur historique ainsi que le domaine de la pathologie cérébrale.

```
<?xml version="1.0" encoding='UTF-8'?>
<!-- CATI_Keosys.xml

&lt;exchange&gt;

&lt;!-- The STUDY
&lt;!-- Constraints: {MEMENTO_IRM, MEMENTO_PET}
&lt;study&gt;MEMENTO_IRM&lt;/study&gt;

&lt;!-- Tracer using during PET assessment
&lt;!-- Constraints MEMENTO_PET : {F-FDG, Amyloid}
&lt;tracer&gt;F-FDG&lt;/tracer&gt;

&lt;!--The center
&lt;centre&gt;
&lt;!--Constraint: {La liste des centres référencés par MEMENTO}
&lt;code&gt;016 - CHU Lyon&lt;/code&gt;
&lt;/centre&gt;</pre>
```

<!--The subject

<subject>

<Constraints {Patient, Healthy Subject Control}

<type>Patient</type>

<!-- The subject code

<code>0160006</code>

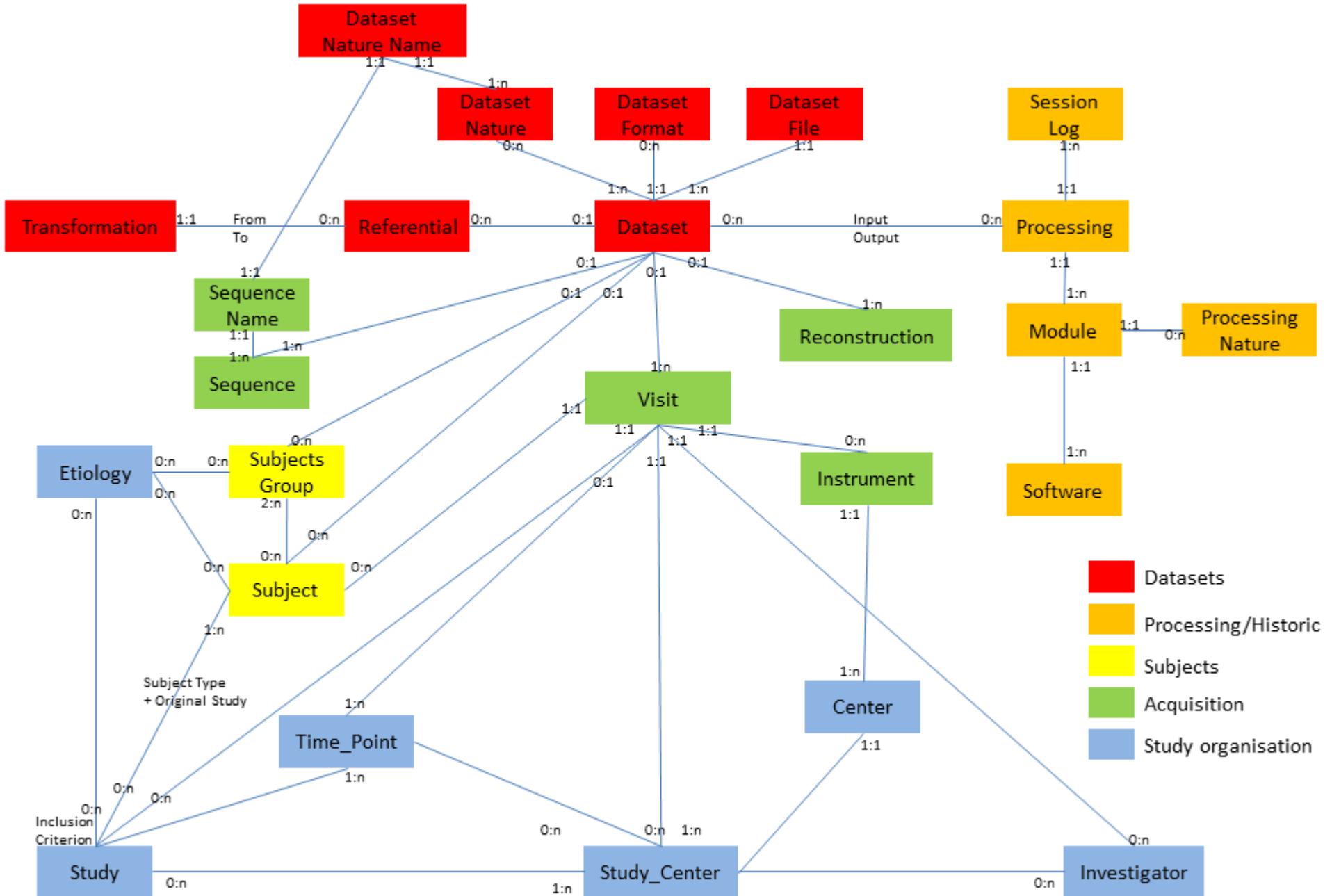
<!--Quadrigram = 2 first letters from the first name and the last name

<quadrigram>MADO</quadrigram>

</subject>

```
<!-- The visit and assessment
<visit>
    <!-- Code - Constraints in MEMENTO : {M000, M024, M048}
<code>M000</code>
    <!--The date - Format YYYYMMDD
<assessment_date>20110630</assessment_date>
</visit>
```

```
<!-- The set : ZIP  
<archive>  
  <name>01234567-20120510160225.zip</name>  
  <MD5 Checksum  
    <md5sum>2cf5fe22cd8a2129d9738ea2726de915</md5sum></  
archive>  
</exchange>
```



Comparaison entre les concepts

| | Study | Visit | Assessment | Series | Acquisition |
|--------------|-------|-------|------------|--------|-------------|
| DICOM | ● | ● | ✗ | ● | ● |
| XCEDE | ● | ● | ✗ | ✗ | ● |
| OntoNeurolog | ● | ● | ✗ | ✗ | ● |
| OntoCATI | ● | ● | ● | ✗ | ● |

| | Dataset | Image | Subject |
|--------------|---------|-------|---------|
| DICOM | ✗ | ● | ● |
| XCEDE | ✗ | ● | ● |
| OntoNeurolog | ● | ● | ● |
| OntoCATI | ● | ● | ● |

- La méthode de création de OntoCATI et de CATISchema repose sur plusieurs principes de conception :
- Le développement d'une ontologie modulaire et multi-niveaux. La structuration de OntoCATI se fera au moyen d'ontologies de haut-niveau (foundational) [2, 3] (i.e., du moins abstrait au plus abstrait, on trouve : les ontologies de domaine, les ontologies noyaux (core-domain) et les ontologies fondationnelles). Nous suivons ainsi l'approche retenue dans OntoNeuroLOG « structurée au moyen d'une ontologie de haut niveau et intégrant des ontologies génériques de plusieurs domaines » [4]. OntoCATI s'appuie sur OntoNeuroLOG [4] en réutilisant les concepts existants et/ou en les spécifiant et si besoin en créant des concepts originaux.
- Le développement de OntoCATI et de CATISchema tient compte de la modélisation des objets DICOM et des schémas de données émergeants dans les études cliniques et de recherche et notamment de XCEDE [5] dont le

Définitions

| | ACQUISITION |
|--------------|--|
| DICOM | |
| XCEDE | Each set of data collected (perhaps by different instruments) over this time interval should be represented by an <i>acquisition</i> |
| OntoNeurolog | A dataset acquisition is a conceptual action. [ep/er] every dataset acquisition has for result a dataset at a time interval |
| OntoCATI | |

| | DATASET |
|--------------|--|
| DICOM | |
| XCEDE | |
| OntoNeurolog | |
| OntoCATI | A dataset set of values is a proposition. [ep/er] every dataset set of values is a proper part of only one dataset during a time interval. |

Définitions

| | ASSESSMENT |
|--------------|--|
| DICOM | |
| XCEDE | |
| OntoNeurolog | |
| OntoCATI | An assessment is the examination of a subject during a visit |

| | SERIES |
|--------------|---|
| DICOM | Sometimes a study consists of several different views or acquisitions, such as pre- and post-contrast CT scans, or T1- and T2-weighted MR views. Each view or acquisition is generally called a series. |
| XCEDE | |
| OntoNeurolog | |
| OntoCATI | |

Correspondances

| DICOM | XCEDE | OntoNeurolog | OntoCATI |
|--------|-------------|--------------|------------|
| Study | Study | | Assessment |
| Visit | Visit | Visit | |
| Series | Acquisition | Dataset (?) | |
| Image | Image | | |

| Table | Champ | Règle |
|-------------------|-------------------------|--|
| Study | Acronym | Tag XML <study> |
| Rel_Study_Subject | Subject_Type | Tag XML <subject>.<type> |
| Visit | Code | Tag XML <visit>.<code> |
| Visit | Time_Point | Partie numérique du code |
| Subject | Quadrigram | Tag XML <subject>.<quadrigram> |
| Subject | Code | Tag XML <subject>.<code> |
| Center | Name | Code Center sans valeur numérique |
| MR_Instrument | Manufacturer | DICOM 0008,0070 |
| MR_Instrument | Model | DICOM 0008,1090 |
| MR_Instrument | Serial_Number | DICOM 0018,1000 |
| MR_Instrument | Magnetic_Field | DICOM 0018,0087 |
| MR_Instrument | Software_Version | DICOM 0018,1020 |
| MR_Instrument | Transmit_Coil | DICOM 0018,1251 Transmit coil |
| Receive_Coil | Name | DICOM 0018,1250 Receiving coil |
| Assessment | Date | DICOM :
max(studyDate,seriesDate,contentDate) = max(00080020,00080021,00080023) |
| Assessment | Domain | par défaut Imaging, puis dans le futur f(Study) |
| Assessment | DICOM_Study_Description | DICOM 0008,1030 study description |
| Assessment | Duration | f(Study) en minutes (Memento 41-50) |
| Dataset | Name | DICOM 0008,103E Series description |
| Dataset | Series_Number | DICOM 00200011 SeriesNumber |
| Dataset_File | Instance_Number | DICOM 00200013 InstanceNumber |
| Dataset_File | Rows | DICOM 0028 0010 Rows |
| Dataset_File | Columns | DICOM 0028 0011 Columns |
| Dataset_File | Pixel_Spacing | DICOM 0028 0030 PixelSpacing |

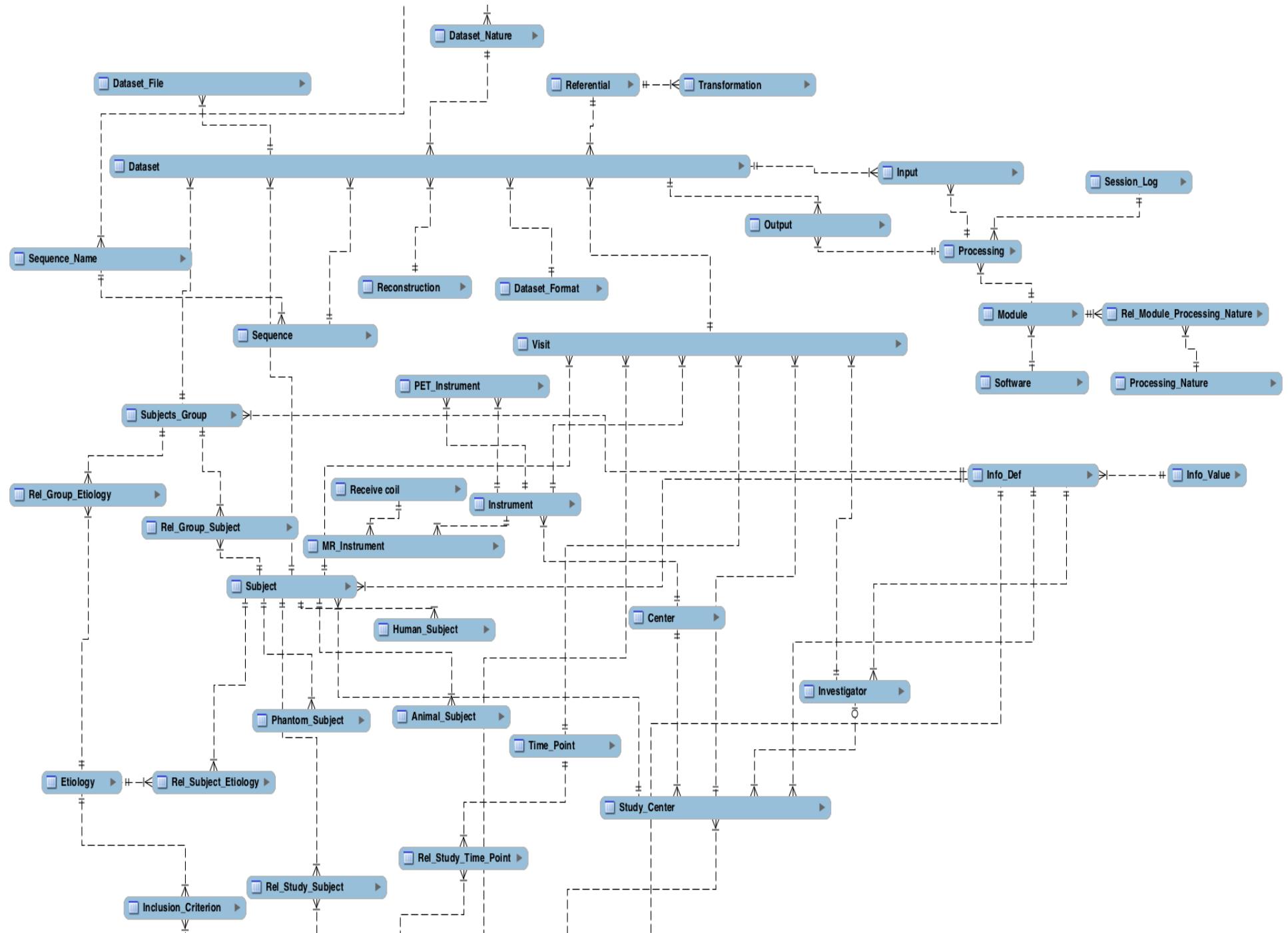
- Une gestion simultanée de trois manifestations de l'ontologie : OntoCATI sera spécifiée au moyen du langage semi-informel OntoSpec [6], en OWL et sous la forme d'un modèle relationnel de base de données.
- CATI BUFFER n'est pas une base de connaissances mais une base à visée de recueil exhaustif. Ce point de vue entraîne une certaine simplification de la modélisation. L'intégration d'un champ dans le modèle physique des données – d'un attribut (schéma de données), d'un axe sémantique (ontologie) – n'est pertinent qu'à la condition de ne pas provoquer l'introduction de champs qui resteraient vides dans CATI BUFFER.

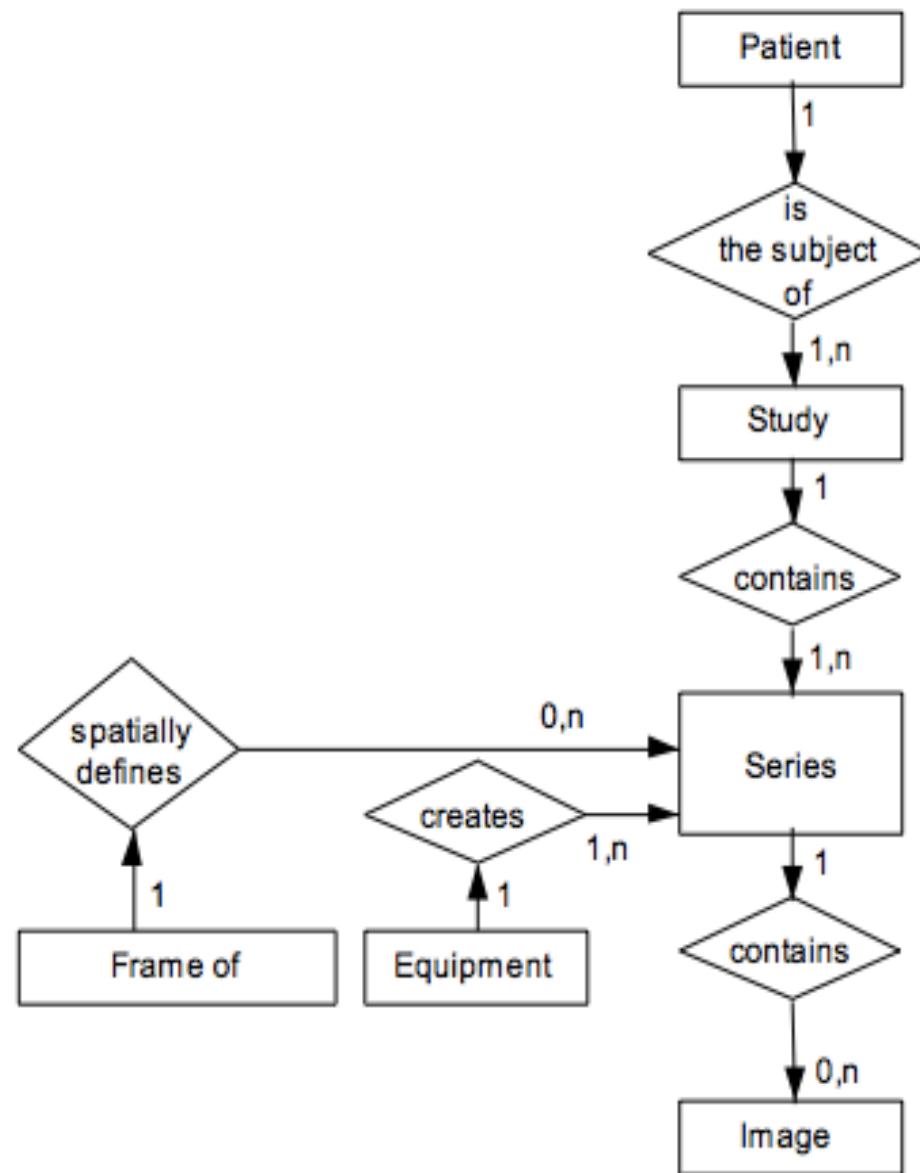
- Une première version de CATISchema fait office de modèle sémantique commun pour les ressources du CATI BUFFER et a permis de structurer les données IRM et PET recueillies dans le cadre de l'étude MEMENTO. Des routines (API Oracle/DICOM) alimentent automatiquement certains champs de la base Oracle à partir des métadonnées des fichiers images DICOM. Un premier effort d'alignement tenant compte de OntoNeuroLOG, DICOM et XCEDE a été réalisé pour un ensemble de concepts majeurs (Subject, Study, Time Point, Visit, Instrument, Dataset, Dataset File). La définition du schéma et de l'ontologie s'étendra dans un deuxième temps aux besoins des traitements d'images et au déploiement de la plateforme CATI à Neurospin.

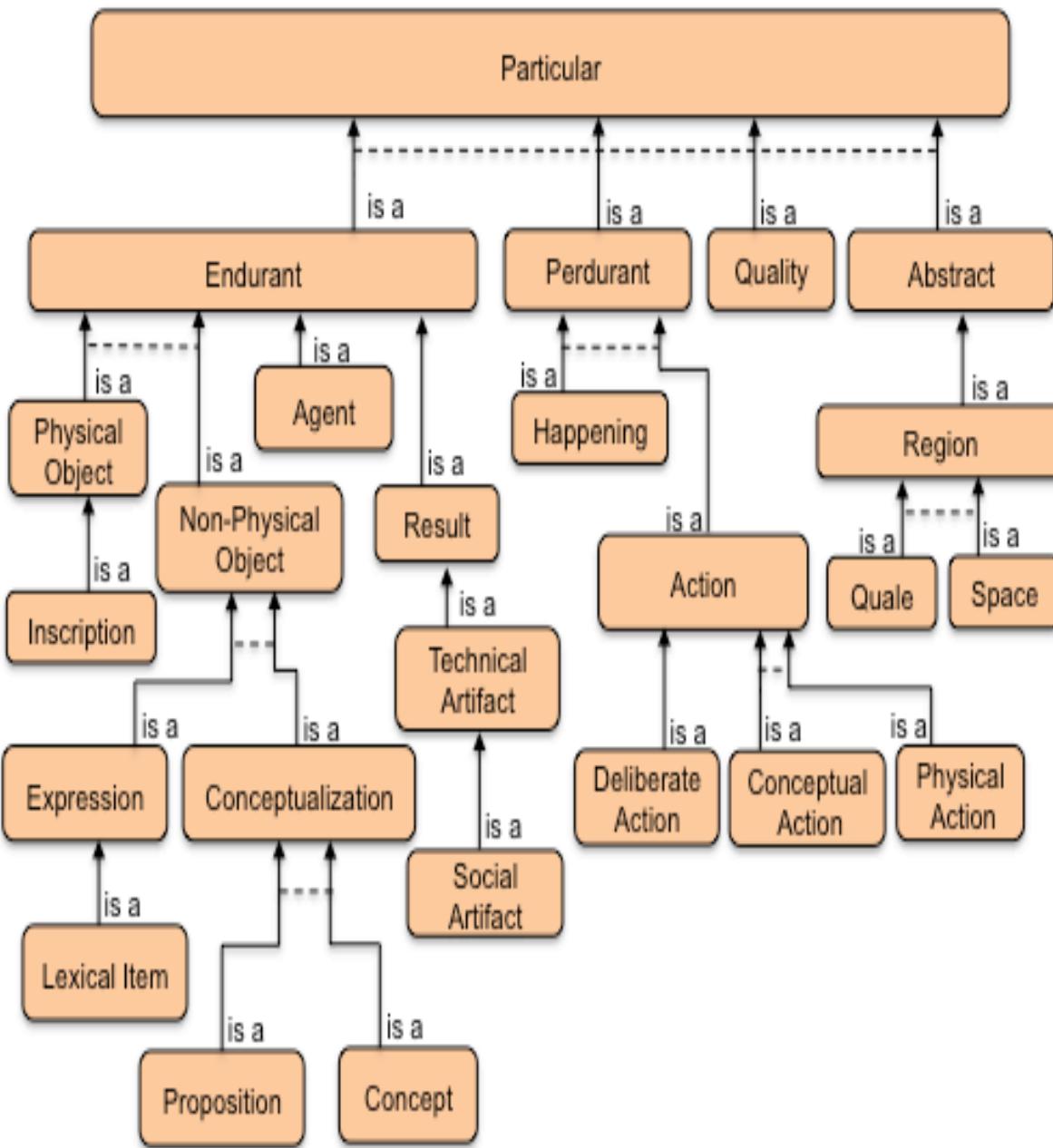
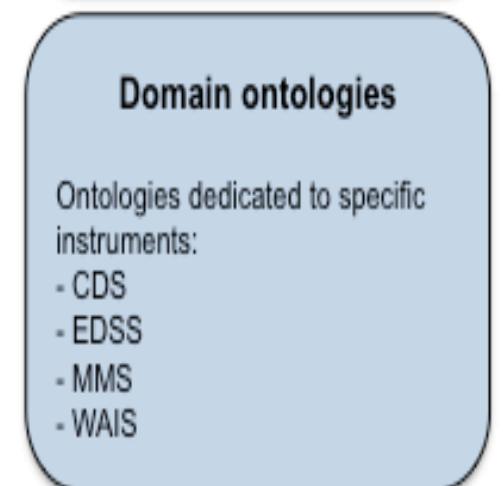
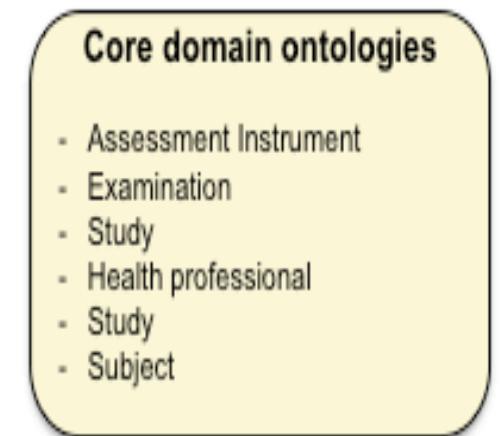
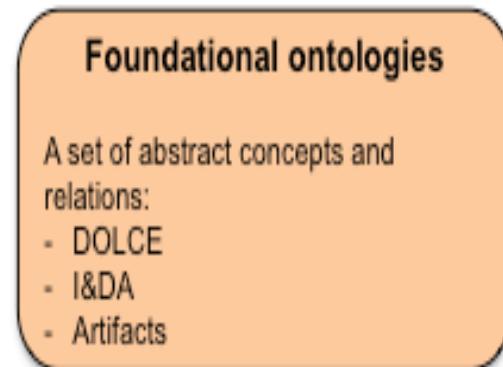
Définitions

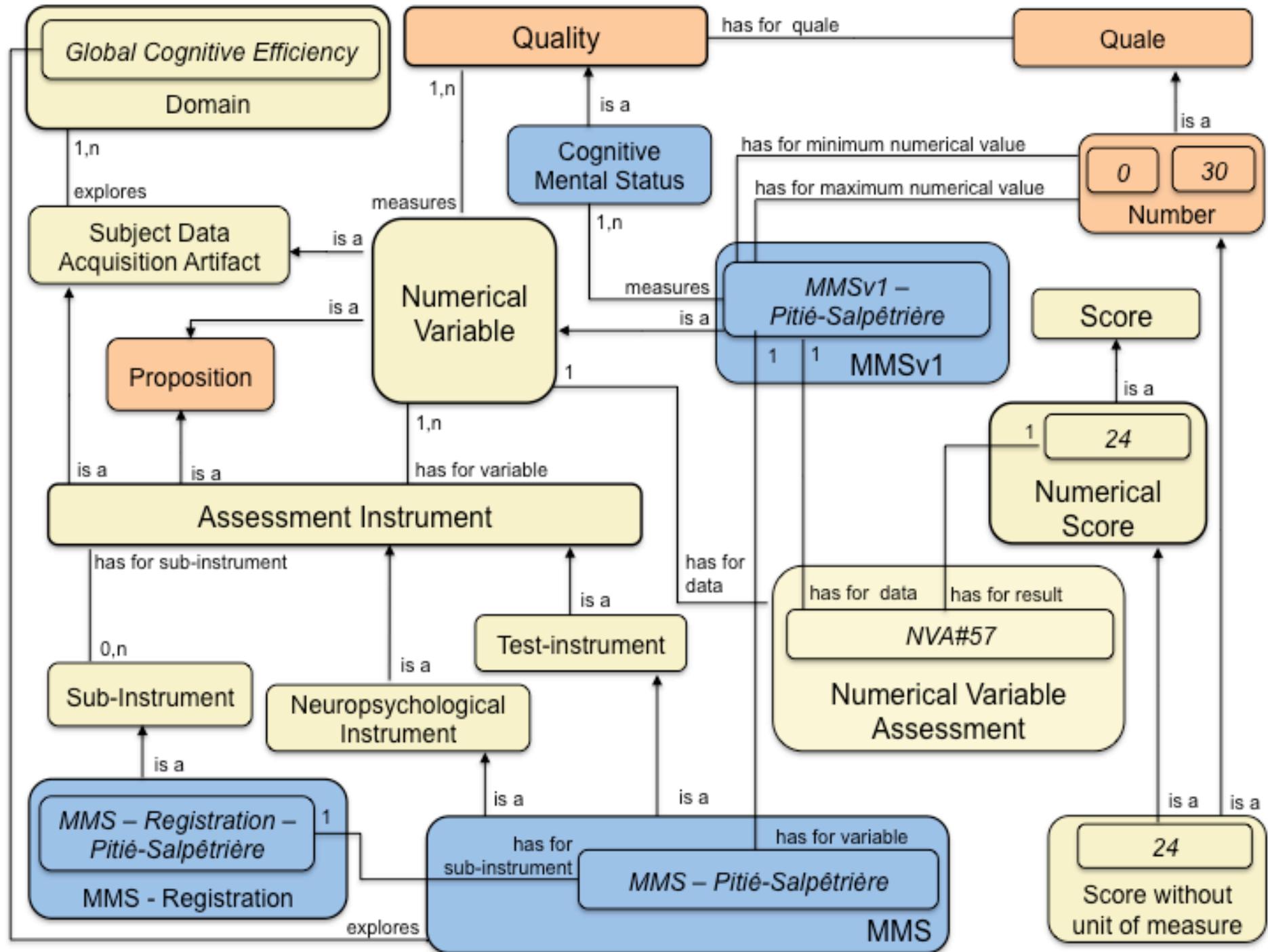
| | STUDY |
|--------------|--|
| DICOM | The scanner console constructs a set of images from the raw data. This set of images is called a study |
| XCEDE | A study consists of one or more data collection <i>episodes</i> |
| OntoNeurolog | A STUDY is a research investigation (therefore a CONCEPTUAL ACTION) involving human subjects that is designed to answer specific questions about brain functions or dysfunctions |
| OntoCATI | |

| | VISIT |
|--------------|---|
| DICOM | One or more DICOM Visits may be associated with a Service Episode. The DICOM Visit is a part of the Service Episode. The Service Episode describes several administrative aspects of healthcare, while the DICOM Visit is limited to the description of one visit of a Patient to a facility. |
| XCEDE | A <i>visit</i> may represent a subject's appearance at an experiment "site" (for collaborative projects, this could be the institution or lab at which the data is being collected or analyzed). A visit may be further subdivided into one or more <i>studies</i> |
| OntoNeurolog | |
| OntoCATI | A visit may represent a subject's appearance at an experiment "site" |









Feedback about data upload

- 50% via Keosys
- 50% via CD and post office stored on a WP1 local disk
- Gap between organization on paper and field reality
- Development of a java interface to output the XML files and the Zip file and to push them on the CATI BUFFER

Comparaison entre les concepts

| | Study | Visit | Assessment | Series | Acquisition |
|--------------|-------|-------|------------|--------|-------------|
| DICOM | ● | ● | ✗ | ● | ● |
| XCEDE | ● | ● | ✗ | ✗ | ● |
| OntoNeurolog | ● | ● | ✗ | ✗ | ● |
| OntoCATI | ● | ● | ● | ✗ | ● |

| | Dataset | Image | Subject |
|--------------|---------|-------|---------|
| DICOM | ✗ | ● | ● |
| XCEDE | ✗ | ● | ● |
| OntoNeurolog | ● | ● | ● |
| OntoCATI | ● | ● | ● |

Définitions

| | STUDY |
|--------------|--|
| DICOM | The scanner console constructs a set of images from the raw data. This set of images is called a study |
| XCEDE | A study consists of one or more data collection <i>episodes</i> |
| OntoNeurolog | A STUDY is a research investigation (therefore a CONCEPTUAL ACTION) involving human subjects that is designed to answer specific questions about brain functions or dysfunctions |
| OntoCATI | |

| | VISIT |
|--------------|---|
| DICOM | One or more DICOM Visits may be associated with a Service Episode. The DICOM Visit is a part of the Service Episode. The Service Episode describes several administrative aspects of healthcare, while the DICOM Visit is limited to the description of one visit of a Patient to a facility. |
| XCEDE | A <i>visit</i> may represent a subject's appearance at an experiment "site" (for collaborative projects, this could be the institution or lab at which the data is being collected or analyzed). A visit may be further subdivided into one or more <i>studies</i> |
| OntoNeurolog | |
| OntoCATI | A visit may represent a subject's appearance at an experiment "site" |

Définitions

| | ASSESSMENT |
|--------------|--|
| DICOM | |
| XCEDE | |
| OntoNeurolog | |
| OntoCATI | An assessment is the examination of a subject during a visit |

| | SERIES |
|--------------|---|
| DICOM | Sometimes a study consists of several different views or acquisitions, such as pre- and post-contrast CT scans, or T1- and T2-weighted MR views. Each view or acquisition is generally called a series. |
| XCEDE | |
| OntoNeurolog | |
| OntoCATI | |

Définitions

| | ACQUISITION |
|--------------|--|
| DICOM | |
| XCEDE | Each set of data collected (perhaps by different instruments) over this time interval should be represented by an <i>acquisition</i> |
| OntoNeurolog | A dataset acquisition is a conceptual action. [ep/er] every dataset acquisition has for result a dataset at a time interval |
| OntoCATI | |

| | DATASET |
|--------------|--|
| DICOM | |
| XCEDE | |
| OntoNeurolog | |
| OntoCATI | A dataset set of values is a proposition. [ep/er] every dataset set of values is a proper part of only one dataset during a time interval. |

Correspondances

| DICOM | XCEDE | OntoNeurolog | OntoCATI |
|--------|-------------|--------------|------------|
| Study | Study | | Assessment |
| Visit | Visit | Visit | |
| Series | Acquisition | Dataset (?) | |
| Image | Image | | |

