Vahine Web Service and framework : some tools for the analysis and the visualization of hyperspectral images

http://mistis.inrialpes.fr/vahine/dokuwiki-2008-05-05

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Vahine partnership and funding

gipsa-lab

INPG

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Mistis

INRIA Rhône-Alpes

This project would not be possible without the financial support of :

AGENCE NATIONALE DE LA RECHERCHE ANR

MDCO program (“Masse de Données et Connaissances”).
ANR-07-MDCO-013.

cnes
CENTRE NATIONAL D'ÉTUDES SPATIALES

through its “R&T Systèmes Orbitaux” program.

VAHINE context

- Astrophysical investigations with visible and near infrared imaging spectroscopy.
- New data : “hypercubes” (big size ~500Mo and 4D)
- Developing models, algorithms, and software able to deal with large hyperspectral dataset
- Project is divided into five work-packages :
  - Statistical image processing
  - Mathematical and physical models
  - Inversion algorithms
  - a framework for the visualization and analysis
  - Vahine Web Service (VWS)

Issues

- Access to data and information within the group
- Data manipulation, visualization and analyses
- Using algorithms with custom workflow

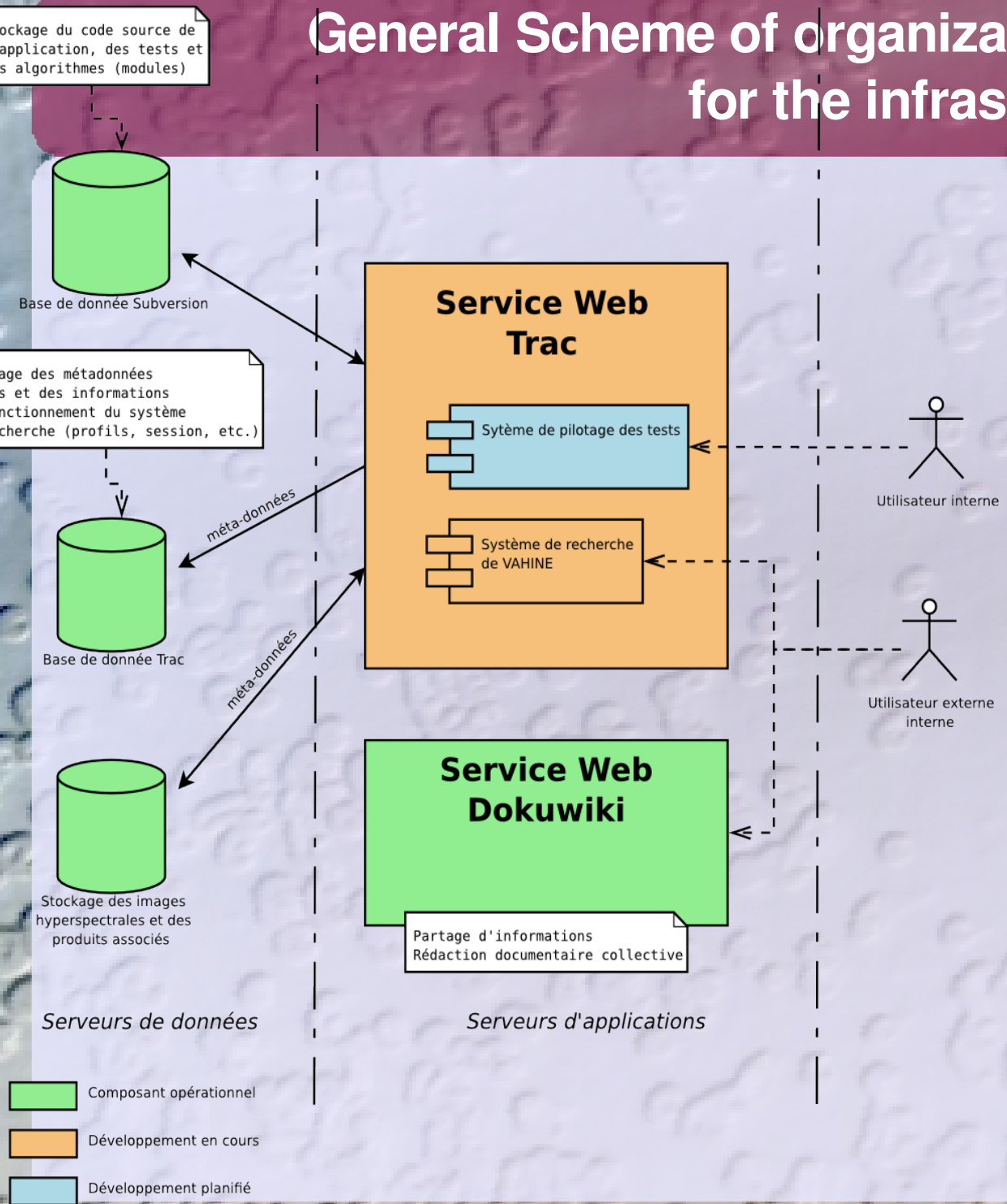
- At this moment we have :
  - Several tera-bytes of data
  - One xls file for searching data
  - Format data is Planetary Data System
  - Several Matlab algorithms
  - We use Envi for visualization

- =>New software application required

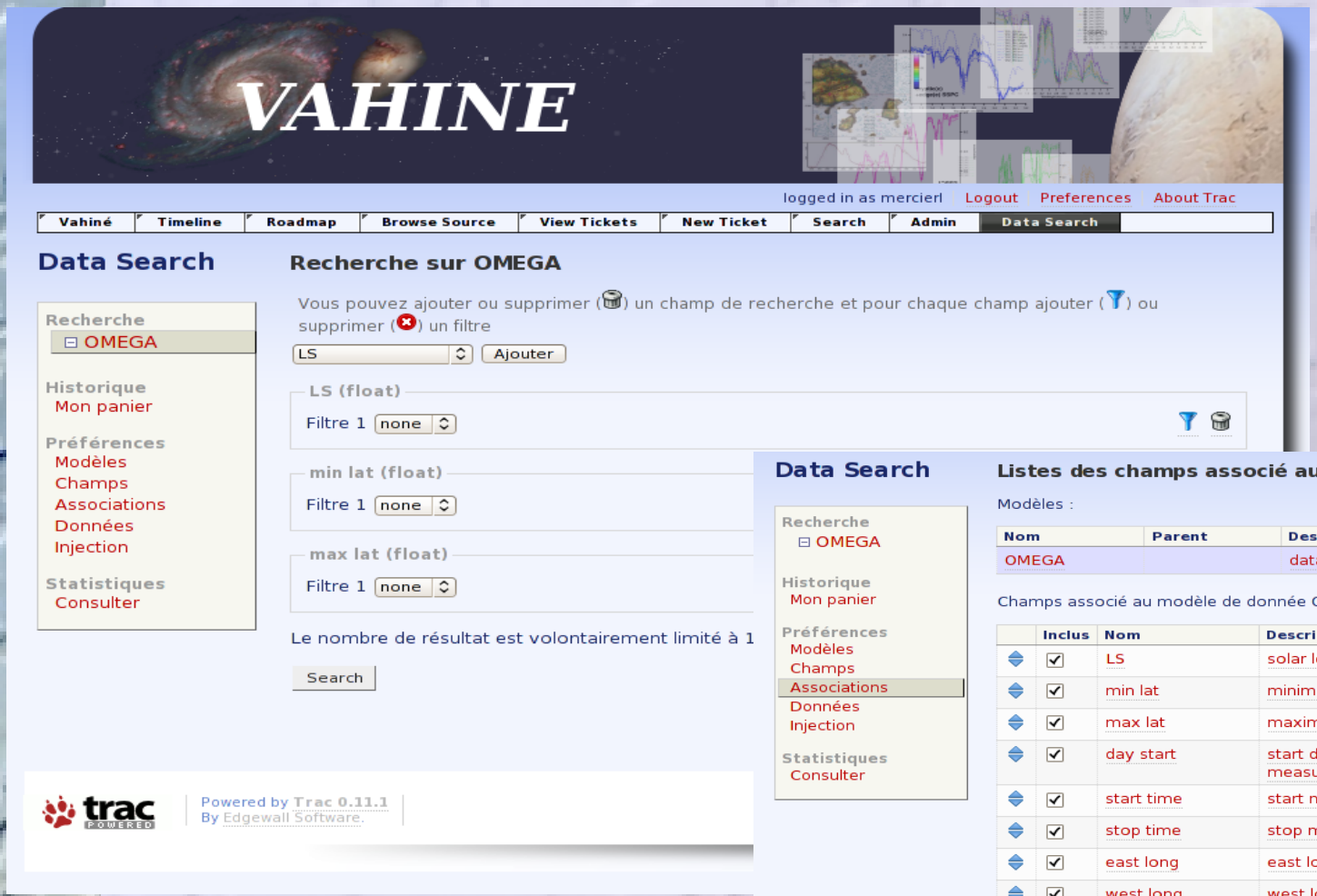
Vahiné Web Service

- a tool for collective writing of documents and for sharing information (Wiki)
- a database of meta-data easing the management of our collections of :
  - hyperspectral observations
  - synthetic hyperspectral images or spectral libraries
  - products generated by the analysis
- a system for :
  - the interrogation of the database (multi-criteria)
  - the retrieval of the data
    - by downloading
    - by direct file access from a piece of software
- a tool for the collective development of algorithms and software

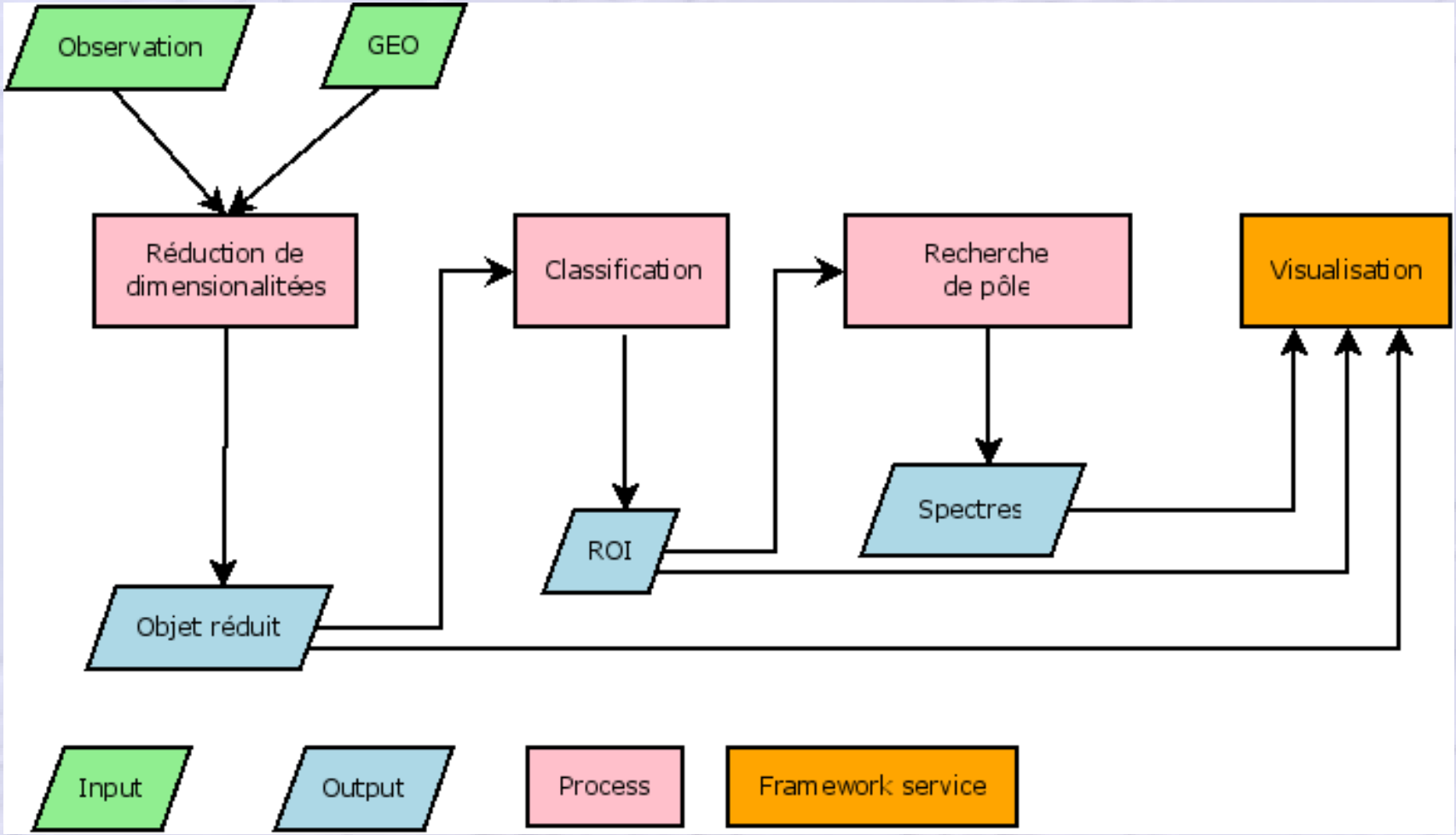
General Scheme of organization and functioning for the infrastructure of the VWS



VWS : data access

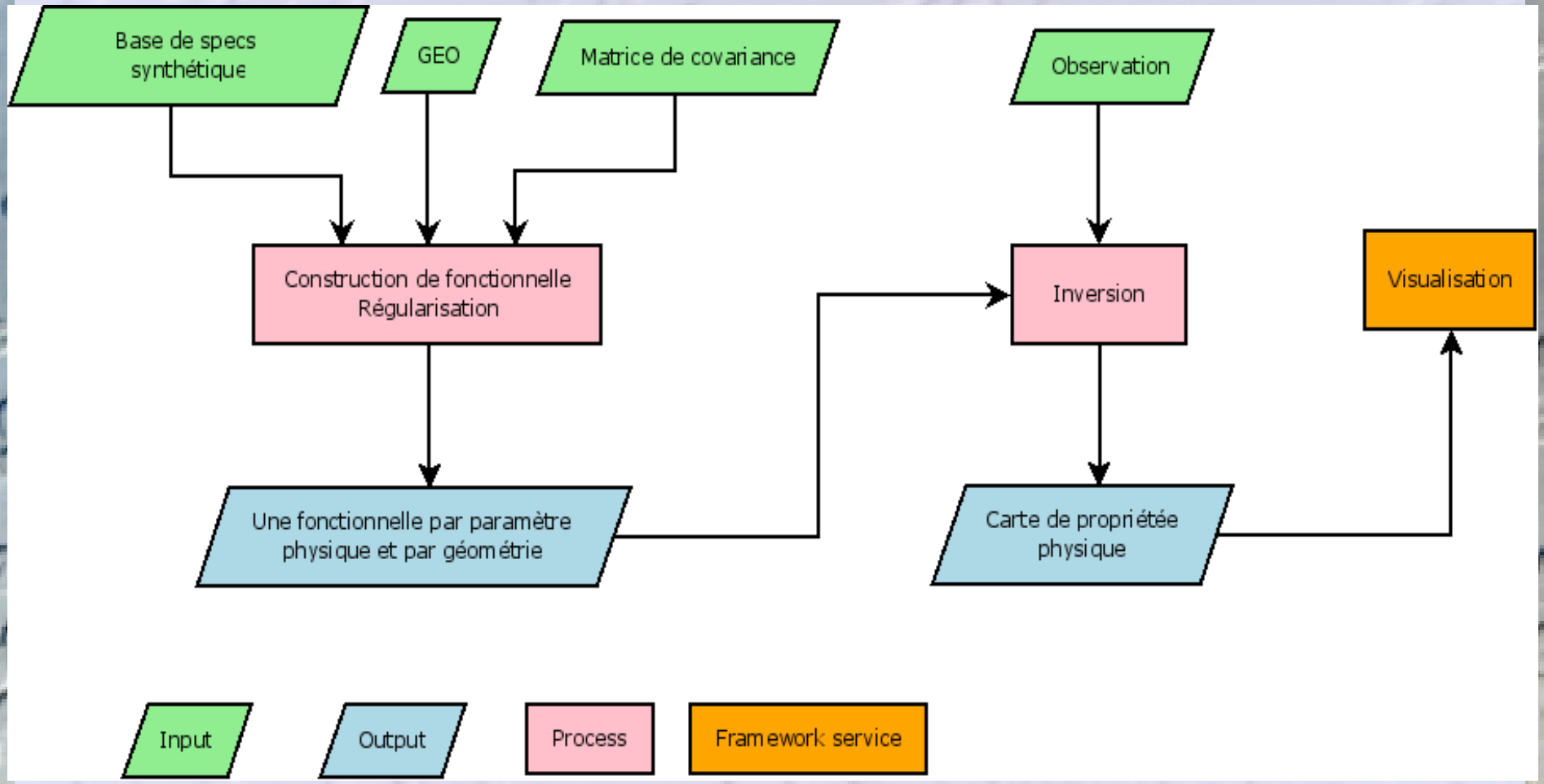


Vahine : typical classification workflow



Each process :
requires input parameters and tuning
generates technical as well as scientific logs

Vahine : typical Inversion workflow



Vahine Framework Requirements

- Current project requirements for software :
  - Human machine interface for controlling processes and data manipulations
  - Informative visualization of data (efficient, fast)
  - Add or remove algorithms for each run
  - Intermediate results between each algorithm
  - Possible grid calculation
  - Easily create custom workflow
  - “Use or do not used” VO normalization ?
  - Scientific tests :
    - sensitivity studies to internal parameters
    - comparison between methods

  of algorithms in a systematic manner

Vahine and the community

- organizing a campaign to gather expectations and other inputs from the community
- valorization :
  - publications in international conferences and journals
  - a software toolbox (publicly available and distributed through the project Web pages)
- one European (possibly international) workshop at the end of the project (early 2011)
- a web site

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