





# VisIVO Science Gateway

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# VisIVO @ Projects

**SCI-BUS** (http://www.sci-bus.eu/)

➔ VisIVO Portlet Liferay+Workflows

➔ VisIVO Mobile

**EDGI** project (http://edgi-project.eu/ )

➔ Porting on DG Infrastructure (2012)

**Man Power**

**INAF**

***3 Staff Pers.*** + 5 Temp. Pers.

**UoP**

***1 Staff Pers.*** + 1 Temp. Pers.

**EGI-Inspire** (http://www.egi.eu/projects/egi-inspire/ )

➔ Porting on gLite

➔ MPI and CUDA on the grid

**Muon Portal** (MIUR)

➔ Nuclear Screening Portal Prototype, Designed To Identify the Contraband of Nuclear Devices and Materials

# SCI-BUS Motivations

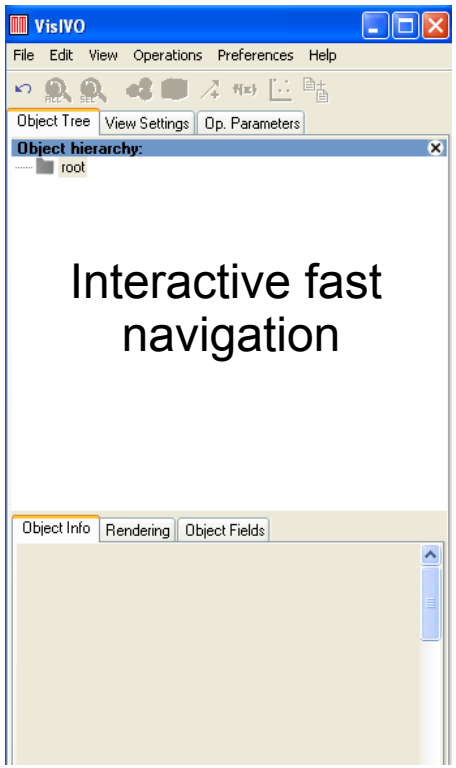
- There are many user communities who would like to access several DCIs (grids, clouds, hpc, clusters) in a transparent way
- They do not want to learn the peculiar features of the used DCIs
- They want to concentrate on their scientific application
- Therefore they need a science gateway

# VisIVO Tools

- Multidimensional Data Exploration ➔
  - Discovery of unknown data characteristics
  - Searching for:
    - ***Outliers***
    - ***Characteristic regions***
    - ***Special properties***
- Large astrophysical datasets as well as any other multidimensional tabular data from other communities.

- VisIVO is designed to deal with large datasets. It supports many types of data formats:
  - HDF5, VOTables, Binary Tables, Ascii , csv, fits…

# VisIVODesktop



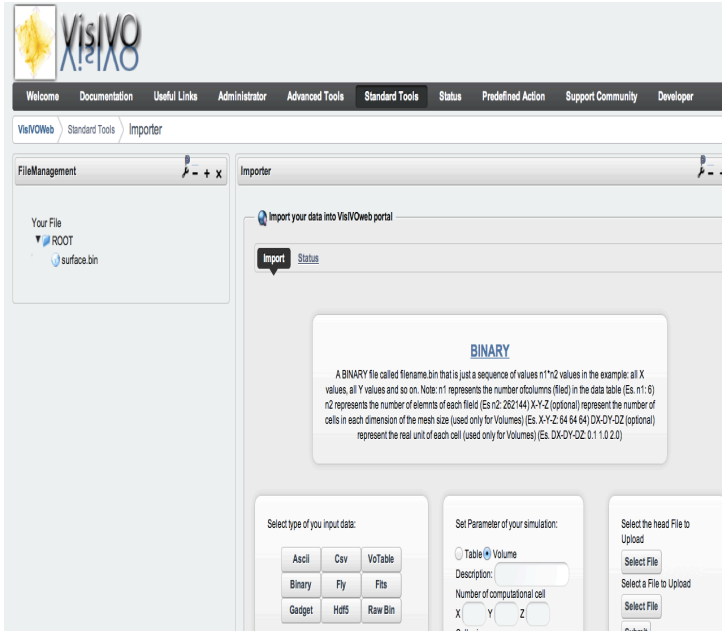

Interactive fast navigation

# VisIVO Science Gateway

# VisIVOServer

**--fformat votable /home/user/demo/vizier.xml**
**.....**
**--x x --y y --z z --color --colortable --colorscalar scalar0 --glyphs sphere**

Linux Mac Windows





# VisIVOMobile

# VisIVO C/C++ Library

***Closely integrated, complementary and independent !***

# VisIVO Server

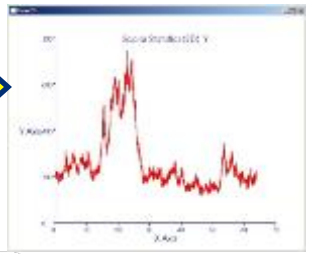
## Basic Architecture

Local or Remote (URL)
User Data

VisIVO Importer

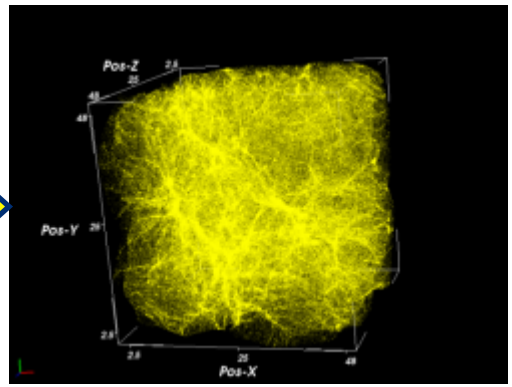
VBT: VisIVO Binary Table

VisIVO Filters



New VBT

VisIVO Viewer



# VisIVO Filters

- ***MLR*** **:** Different level of randomization can be given, creating more detail table in the inner sphere and lower detail in the outer regions, or vice versa
- ***Extract Subregion*****:** Creates a new table from an input table: sub-box or sphere extraction.
- ***Extract Subvolume*****:** Produces a table which represents a subvolume from the original volume
- ***Math. Operations*****:** Creates new fields in a data table as the result of a mathematical operation between existing fields
- ***Point Distribution*****:** Creates a volume using a field distribution on a regular mesh

  ***Select Rows*****:** Creates a new table using limits on one or more fields of a data table

# VisIVO Viewer

**VisIVO Viewer**

is a command line application that produces 3D images from the binary internal data format table (VBT)

The user must specify three fields of the table for 3D representation.

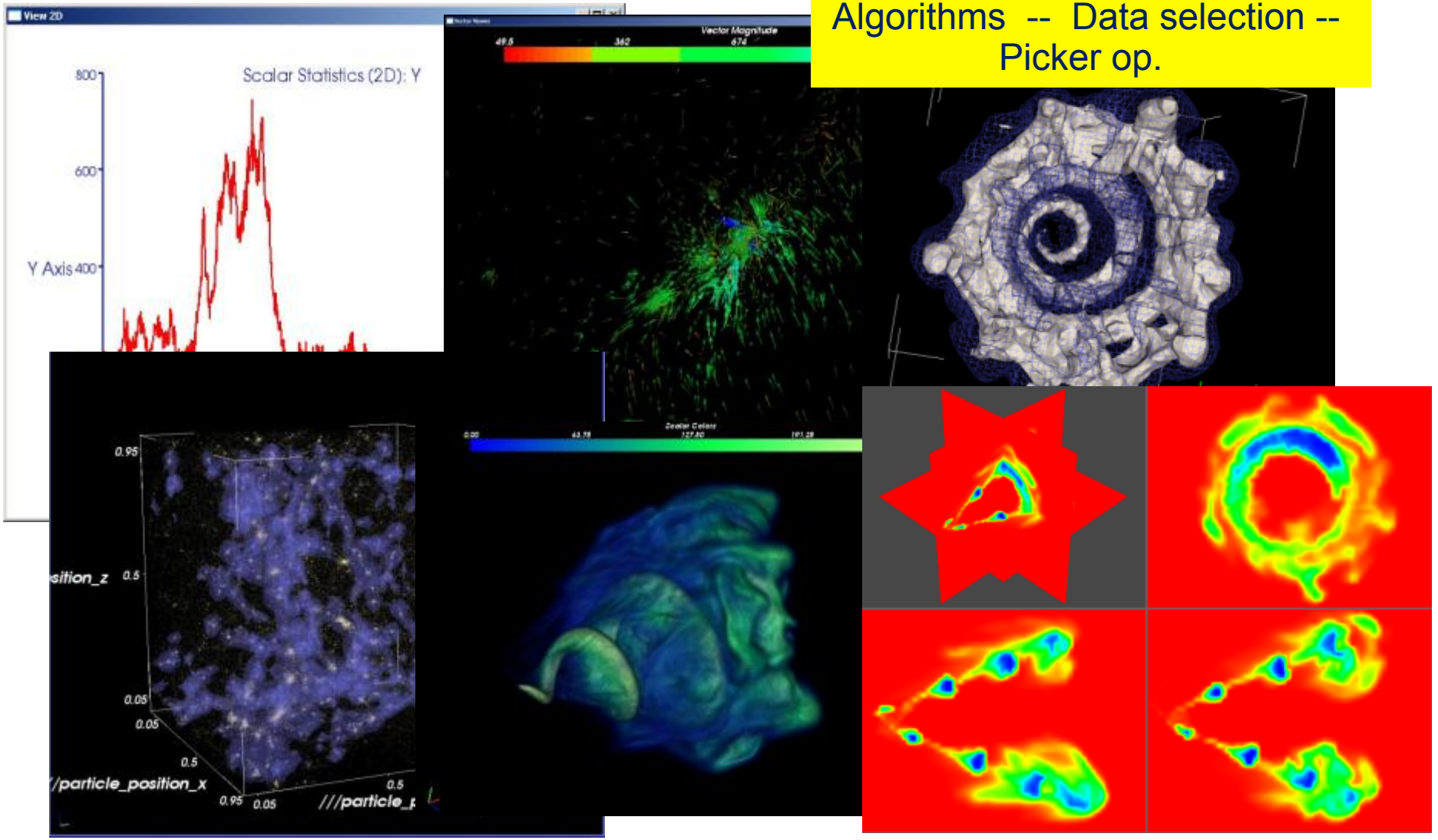
The user can also customize the view by choosing values such as:

- Camera (azimuth/elevation or position, zoom)
- Opacity
- Point shape (pixel/sphere, cube, cone etc..)
- Palette
- ……
- Alternatively, but in a more intuitive way. A view can be generated by giving the camera and focal point position

OUTPUT: VTK / SPLOTCH

# Visualization

Navigation -- Zoom -- Palette -- Algorithms -- Data selection -- Picker op.



# VisIVO Libray: Basic concepts

VisIVO Library sets one or more environment variables for each VisIVO component: Importer, Filters and Viewer. The *VisIVO APIs* are used to set the variable attributes

Environments Declaration

**VisIVOImporter** *IenvVariable*

**VisIVOFilter** *FenvVariable*

**VisIVOViewer** *VenvVariabile*

Filter Environment Setting

**VF_SettAtt(FenvVariable, int code, char *value)**

codes: VF_SET_OPERATION, VF_SET_OUTVBT, VF_SET_FIELDS …

values: randomizer, /home/user/newtab, X Y Z …

Importer Environment Setting

**VI_SetAtt(IenvVariabile, int code, char *value)**

codes: VI_SET_FFORMAT, VI_SET_ENDIANISM, VI_SET_FILEPATH …
values: ascii, bigendian, /home/usermytab, …

Viewer Environment Setting

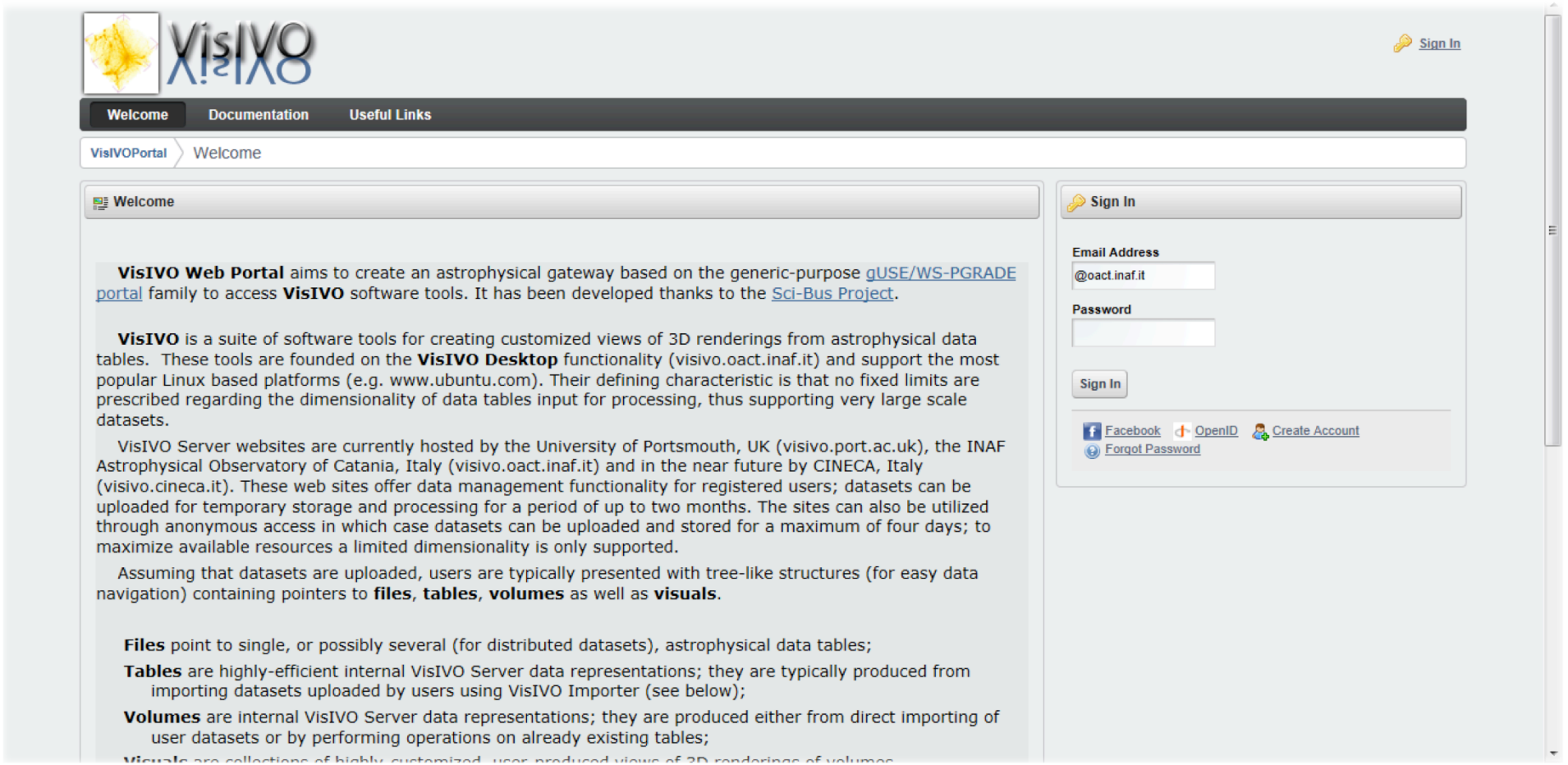
**VV_SettAtt(VenvVariable, int code, char *value)**

codes: VV_SET_CAMERA VV_SET_COLORTABLE, VV_SET_OUT …

values: camerapos, mypalette, /home/user/myImages …

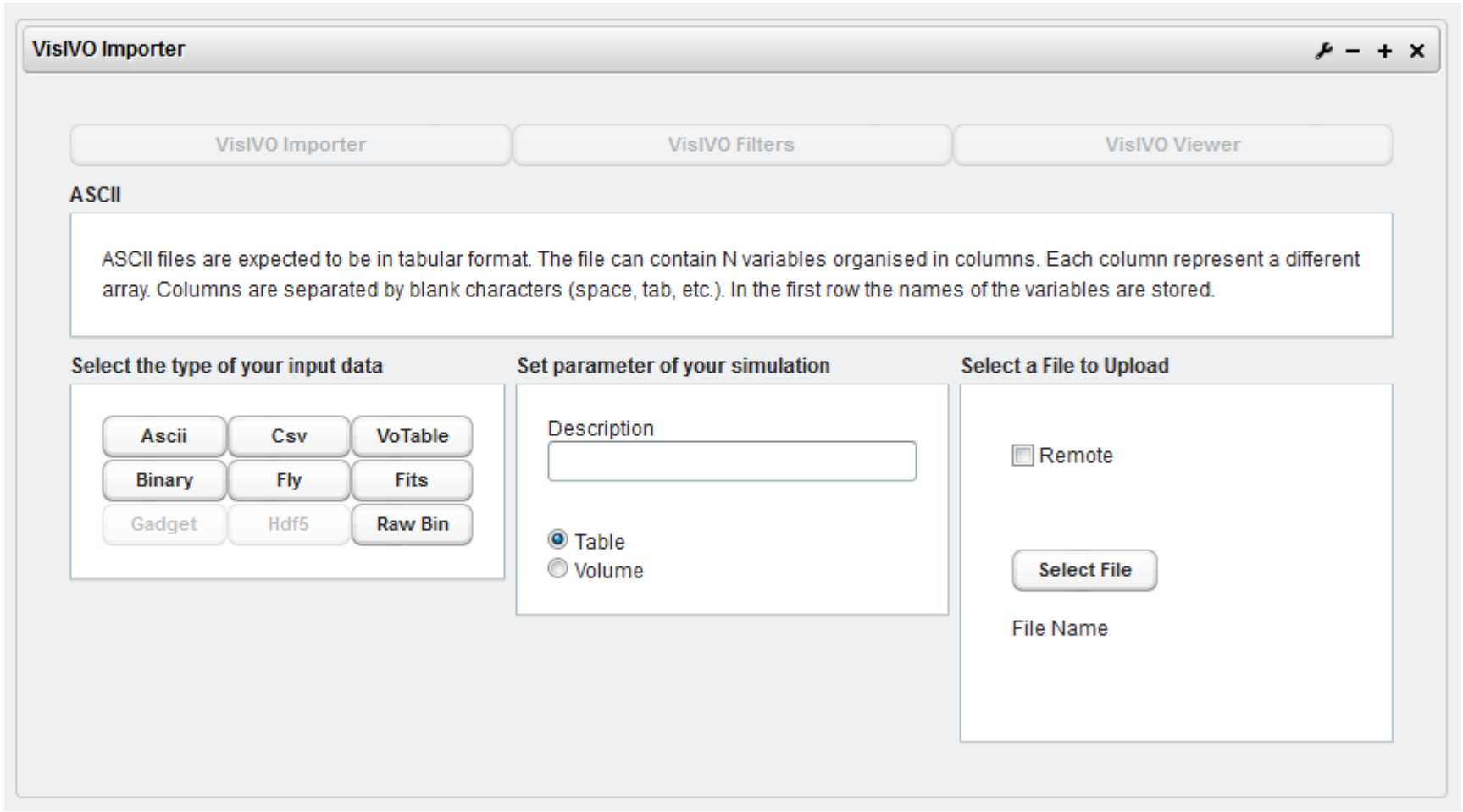
# VisIVO Gateway

# http://visivo.oact.inaf.it:8080



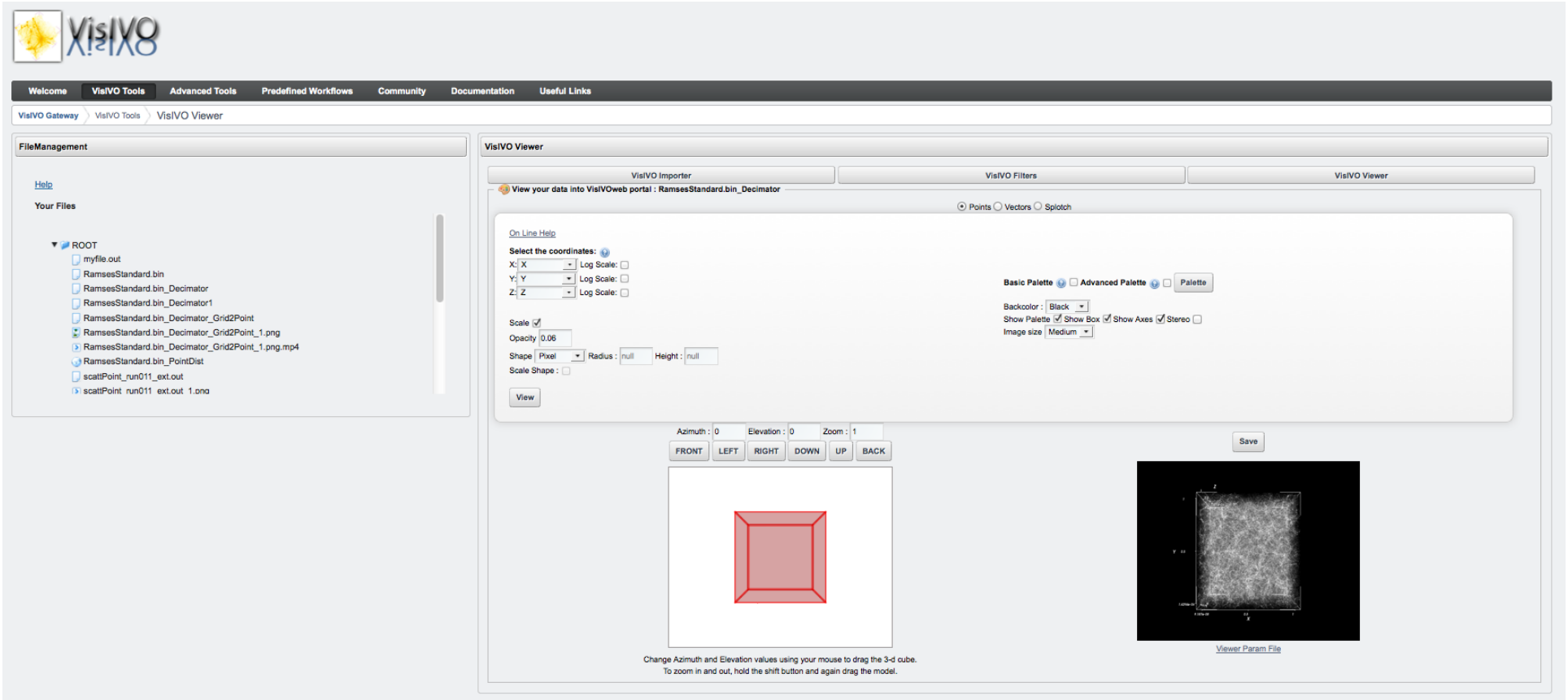
# VisIVO Gateway

## VisIVO Importer



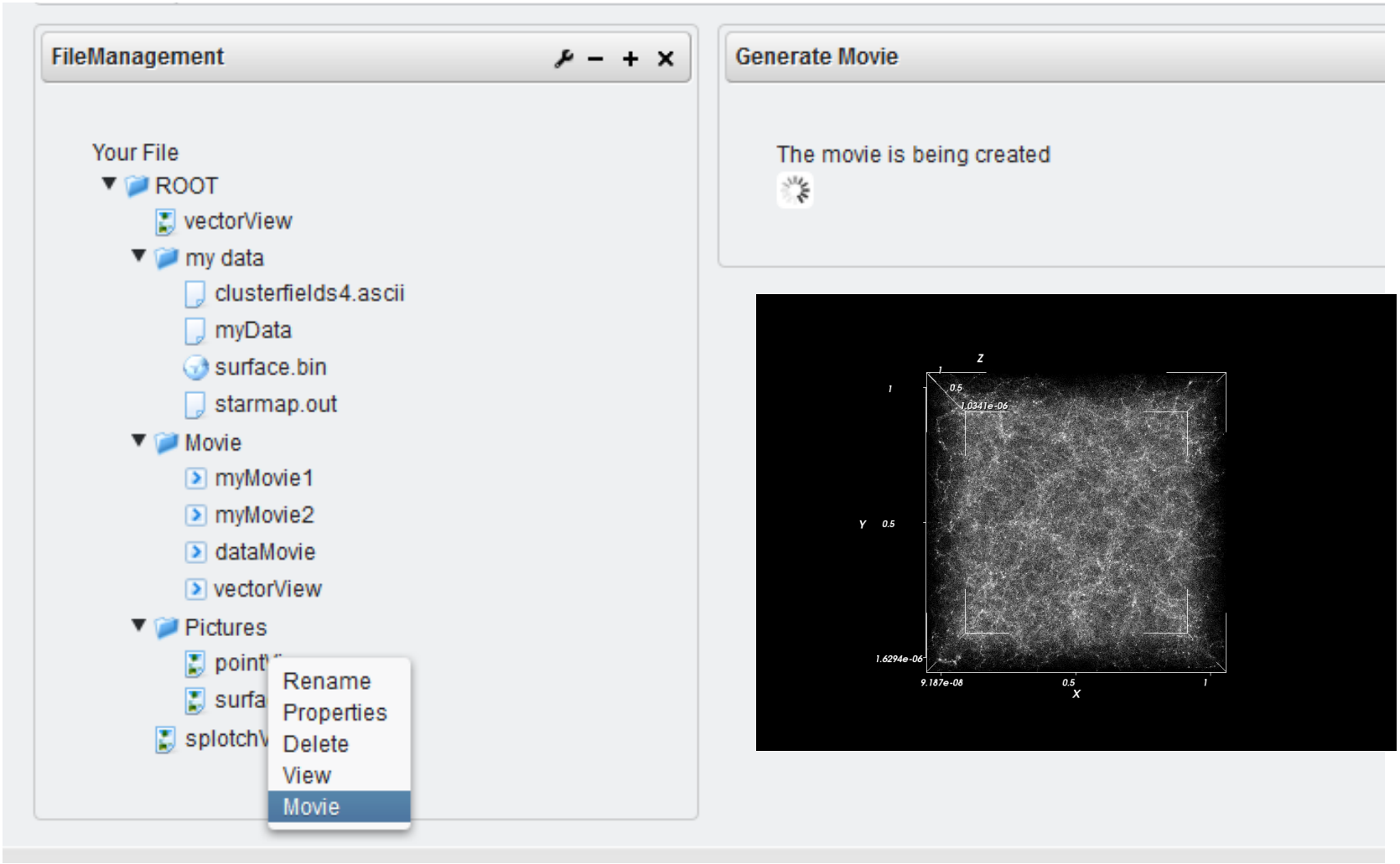
# VisIVO Gateway

## VisIVO Viewer



# VisIVO Gateway

## Panoramic View



# VisIVO Gateway

## Infrastructures

- **Trigrid Cluster** - AMD Dual Opteron 280 2.4 GHz, 14 Blades with 4 cores with 8 GB RAM / Blade (**52 CPU core**) - Total storage: 3.7 TB (lsf)
- 2 X Server Intel Xeon 3060 2.4 GHz, Dual-Core, 2 GB RAM - Total storage: 23 TB
- Server Intel Xeon 3050 2.13 GHz, Dual-Core, 2 GB RAM - Total storage: 8 TB
- **Hybrid system** cpu-GPU, N 2: Intel(R) Xeon(R) CPU E5620 @ 2.40GHz, **24 GB RAM** DDR3-1333 NVIDIA TESLA C2070, **448 cuda core** + 6 GBRam
- **COMETA grid – gLite nodes ~1500 CPU/core (250 hosted at INAF-OACT)** AMD Dual Opteron 280 2.4 GHz **(jdl)**

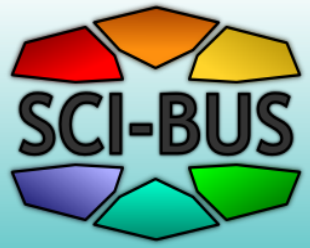
# VisIVOMobile

VisIVOMobile is an iOS universal application

# VisIVOMobile


VisIVOMobile iOS application allows user to log in into VisIVO Gateway to:

- Manage his data
- View/create image/ movie
- Execute and create new WFs




# Demo Movie

# VisIVO in the future

Oriented to ➔ collaborative environments: a new VisIVO Desktop, social networks, user forum, communities support etc

Cloud ➔ Horizon 2020 (Follow up of SCI-BUS, EDGI, TOK etc)

Visual Analytic (Via Lactea FP7) : extended features

Science Gateway: extended portlets

**Back to the Future**
**VisIVO extention ➔ Virtual Observatory**

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science centre | planetarium


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EDGI
SCIBUS

VisIVO Corner

Awards for using VisIVO SG

iPads

2013-2014
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COMPETITION

Awards for Scientific movie

3,000/6,000 Euros for the most challenging movies