



Enabling Grids for E-science

A Grid Implementation of Statistical Parametric Mapping Analysis for Early Diagnosis of Alzheimer Disease

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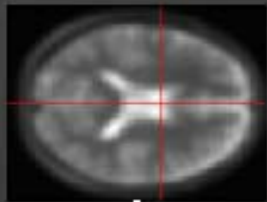
Information Society



- **Statistical Parametric Mapping (SPM)**
- **GRID implementation of SPM**
- **Current Status and Future Plans**

Data transformations

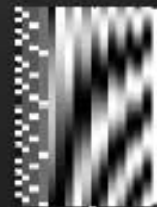
Time-series data



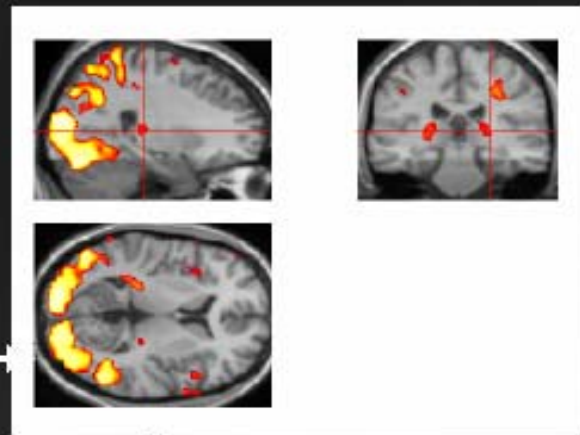
Kernel



Design matrix



Statistical parametric map (SPM)



Realignment

Smoothing

General linear model

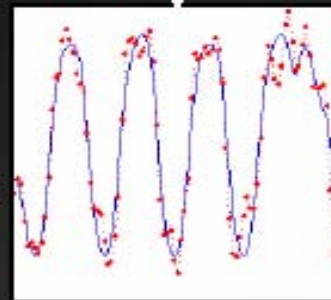
Normalisation

Statistical inference

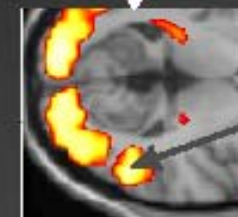
Gaussian field theory



Template



Parameter estimates



$p < 0.05$

www.neur

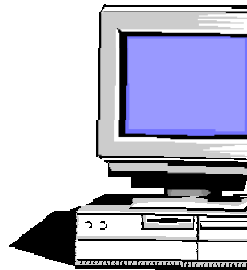
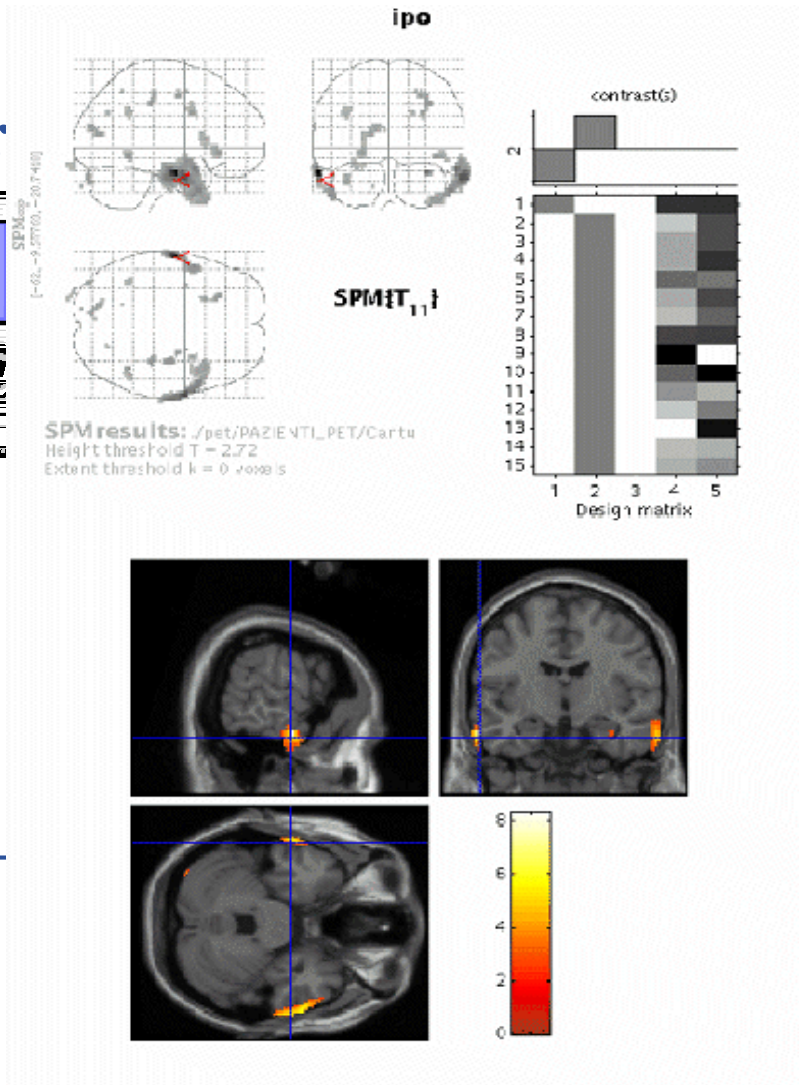
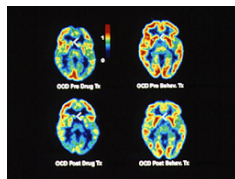


IMAGE of
PATHOLOGICAL
SUBJECT
(PET or SPECT IMAGE)



of CONTROLS 1
(PET, SPECT IMAGES)

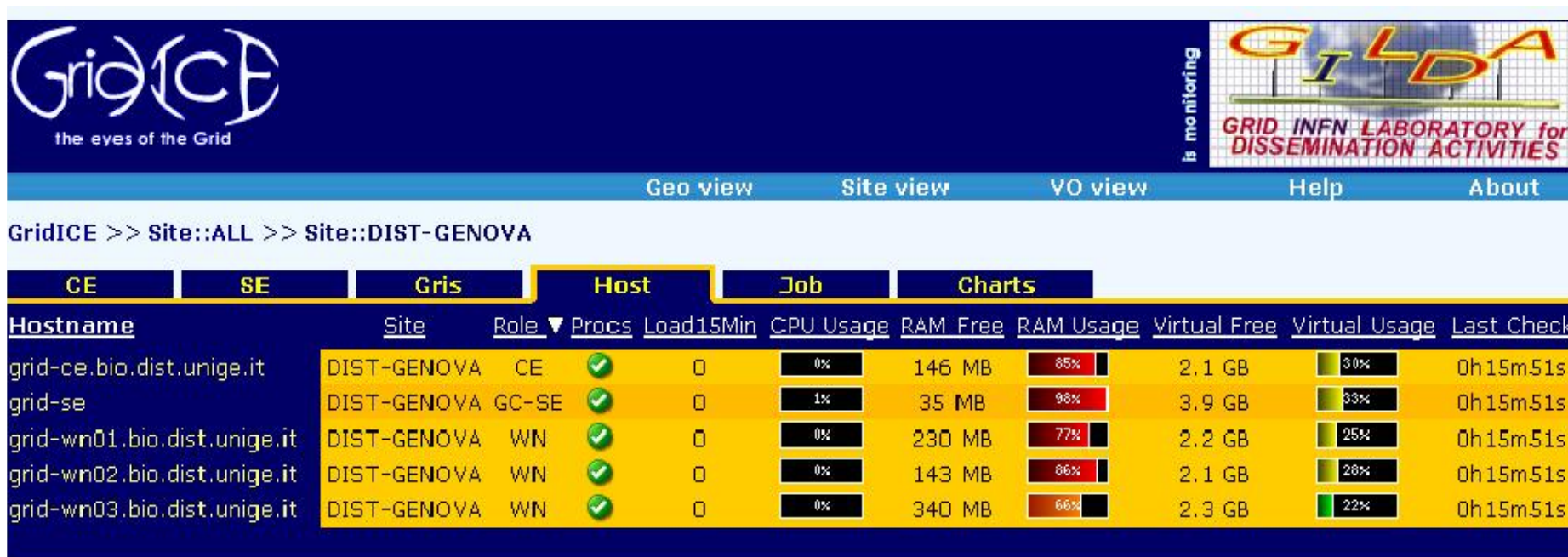
of CONTROLS 2
(PET, SPECT IMAGES)

of CONTROLS 3
(PET, SPECT IMAGES)

...

of CONTROLS n
(PET, SPECT IMAGES)

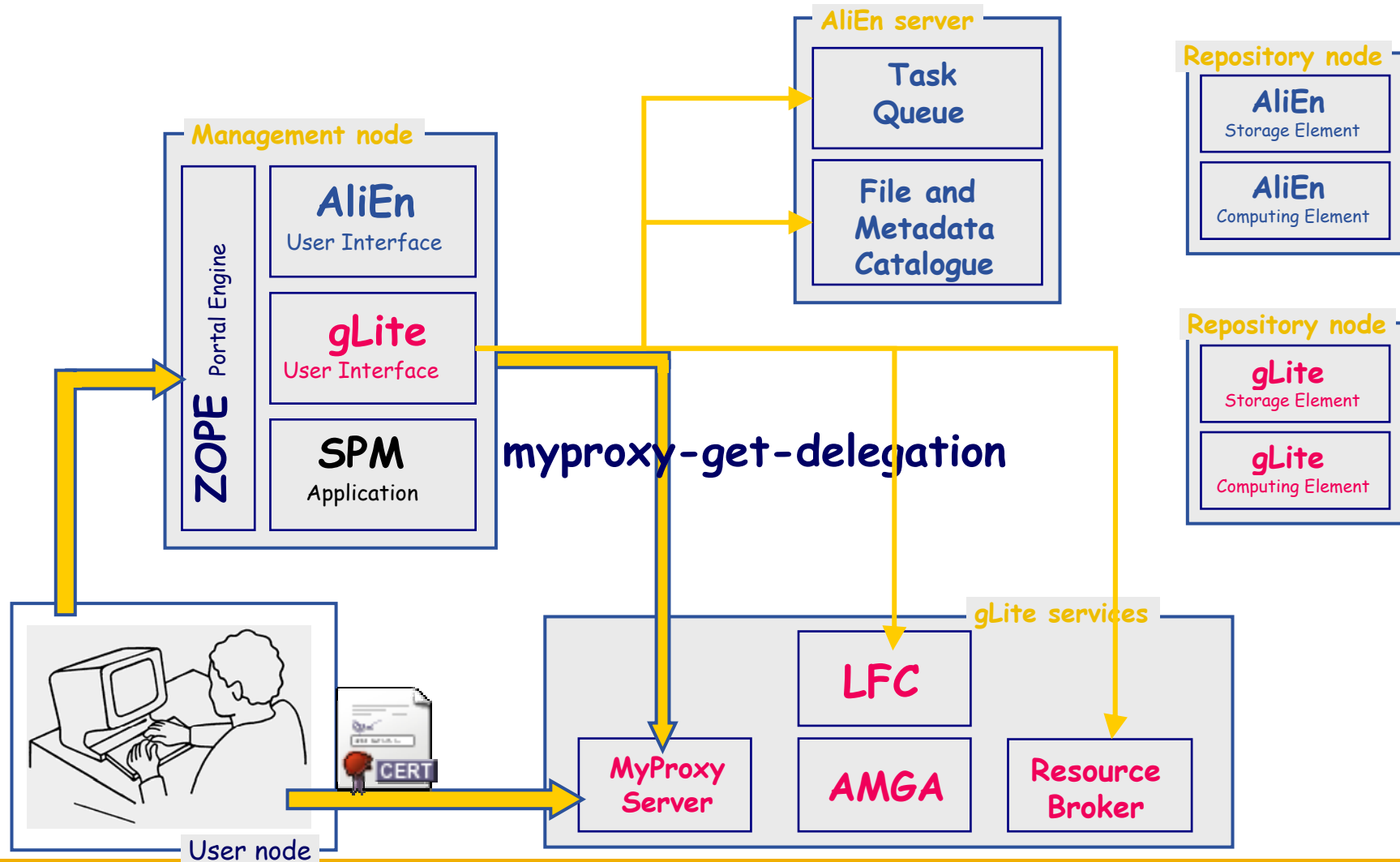
- **A large set of images of normal patients is required to be used for comparison**
- **PET and SPECT studies on normal subjects are very rare**
- **Images of patients are covered by privacy and security issues and for this reason they cannot be freely moved on the net or published by the centre that made the analysis.**

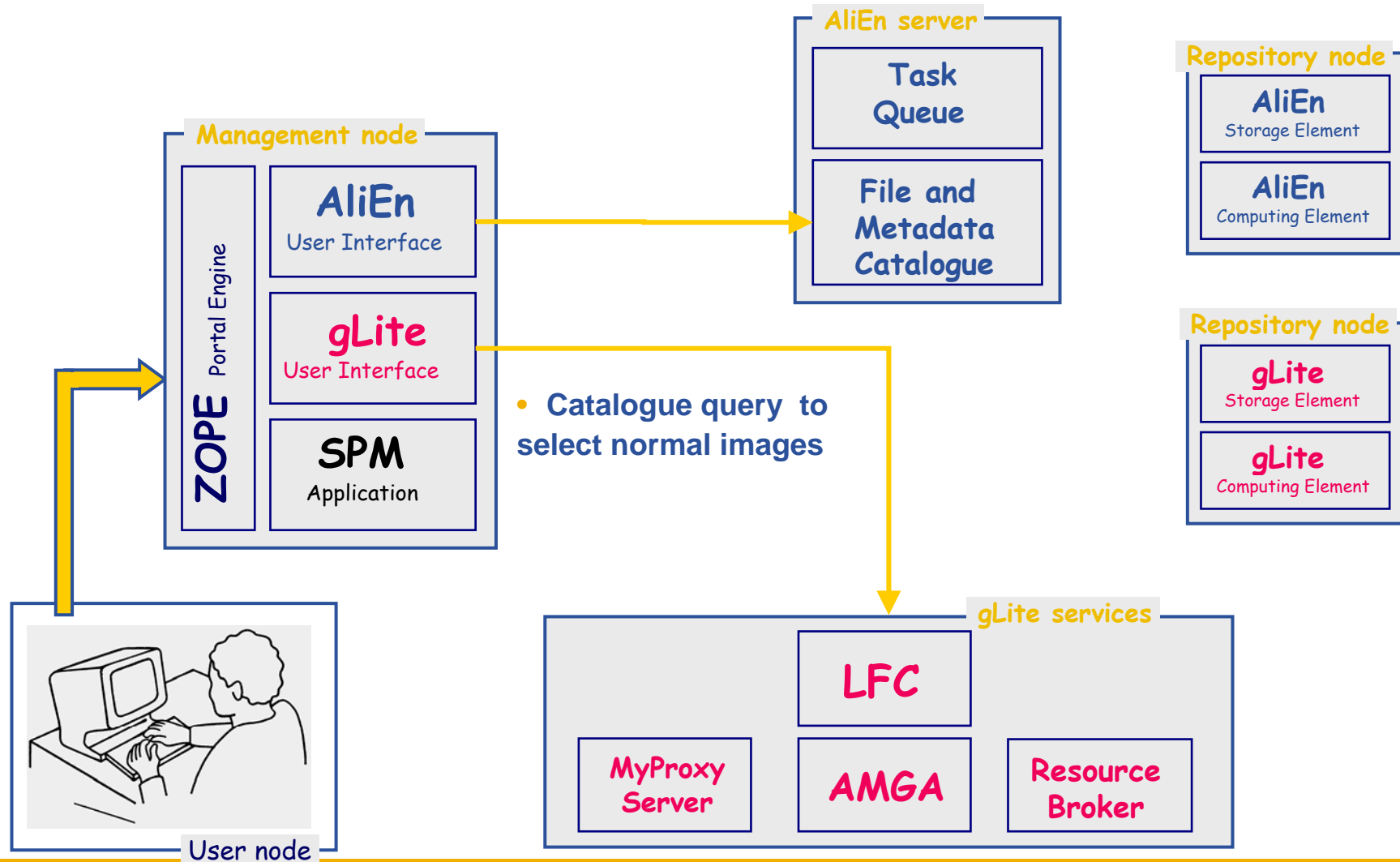


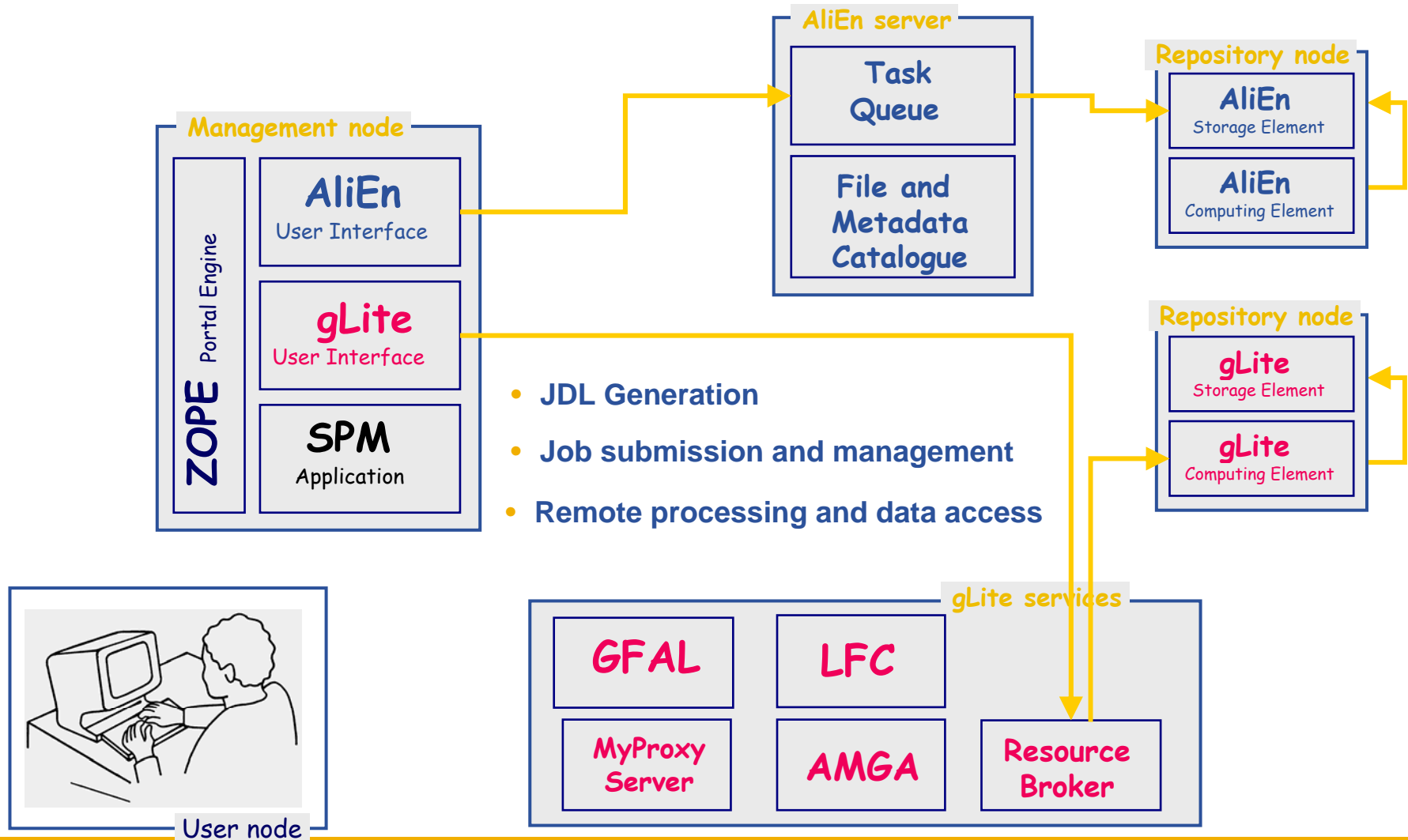
GridICE >> Site::ALL >> Site::DIST-GENOVA

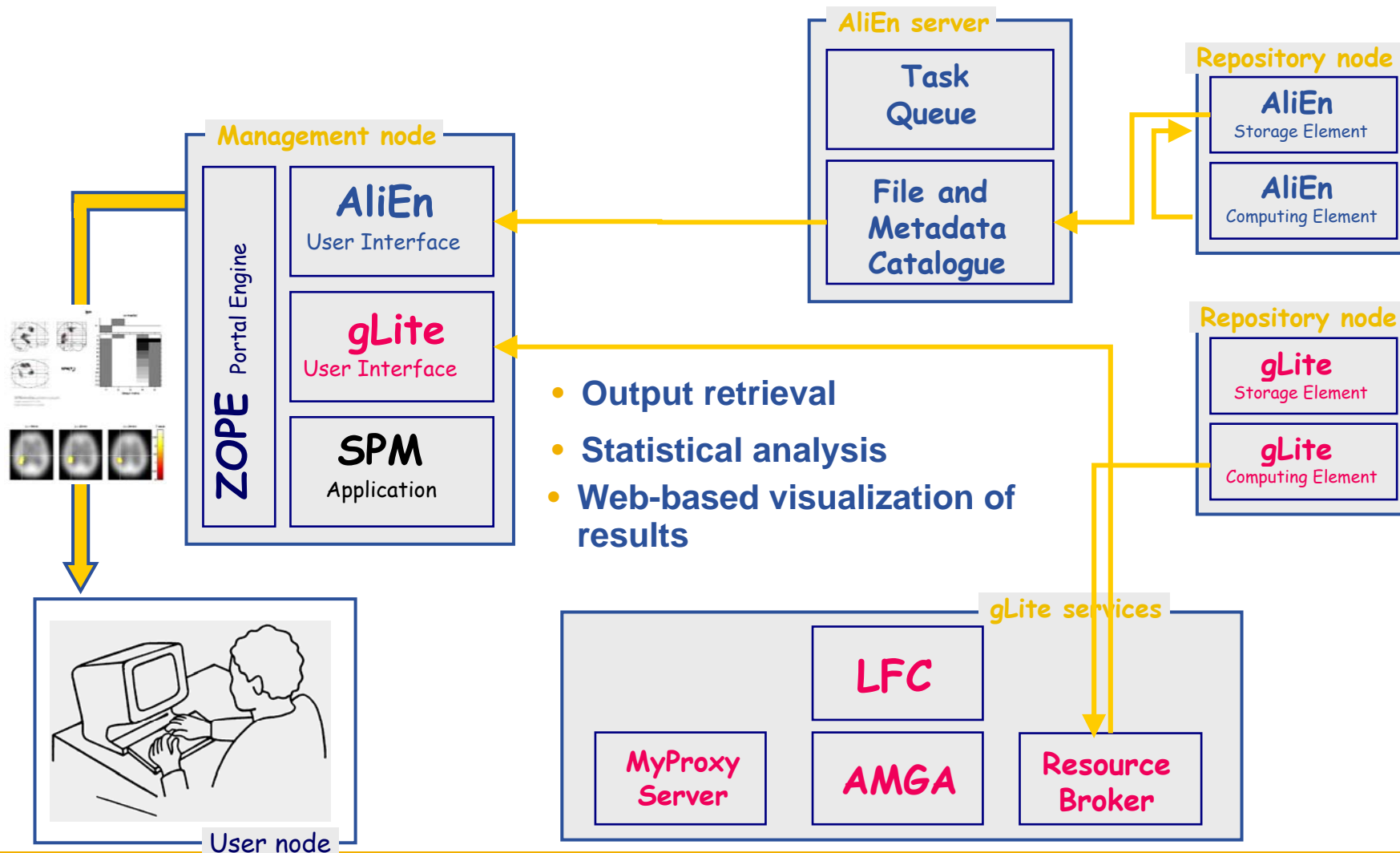
CE	SE	Gris	Host	Job	Charts					
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grid-se	DIST-GENOVA	GC-SE	✓	0	1%	35 MB	98%	3.9 GB	33%	0h15m51s
grid-wn01.bio.dist.unige.it	DIST-GENOVA	WN	✓	0	0%	230 MB	77%	2.2 GB	25%	0h15m51s
grid-wn02.bio.dist.unige.it	DIST-GENOVA	WN	✓	0	0%	143 MB	86%	2.1 GB	28%	0h15m51s
grid-wn03.bio.dist.unige.it	DIST-GENOVA	WN	✓	0	0%	340 MB	66%	2.3 GB	22%	0h15m51s

- Setting up of a Genoa LCG/gLite site
- Testing SPM application on GILDA testbed
- Making available SPM application to EGEE biomed community

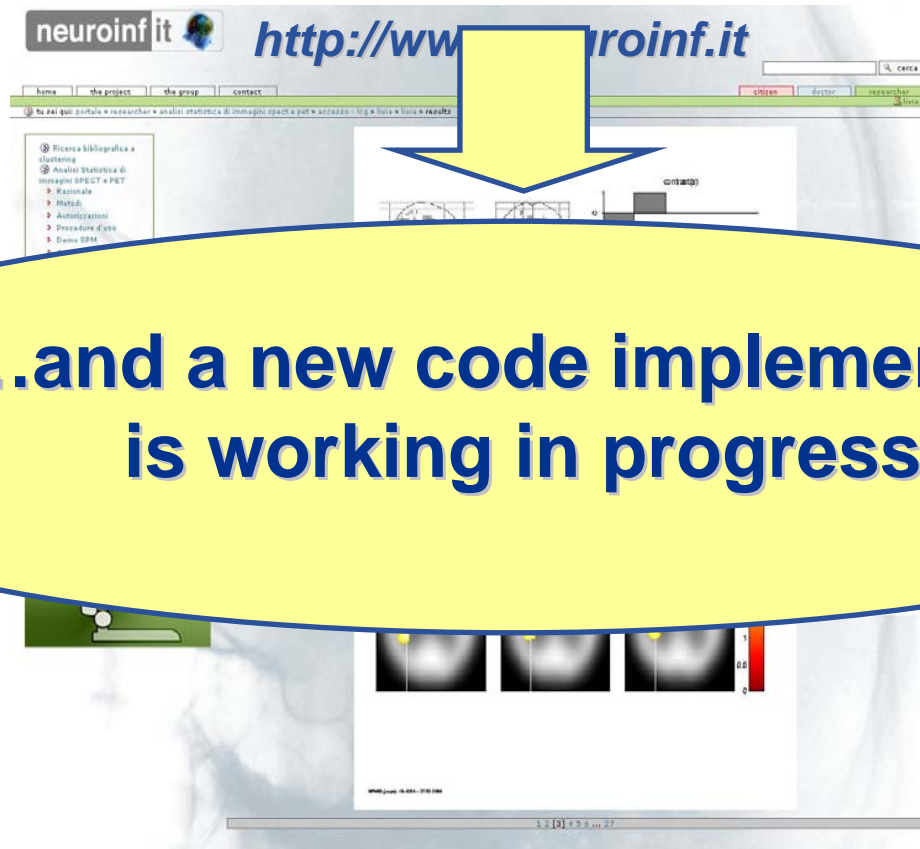








**SPM Demo running on EGEE
infrastructure is now available!**



- **Application**
 - Collaboration with San Raffaele hospital in Milan to perform a scientific validation of our prototype
- **Web Interface**
 - Improve portal services or move to a more solid framework (maybe a Grid Portal as Genius)
- **Overall framework**
 - improve performance and scalability
 - test the VO biomed resources
 - compare computational performances of gLite and AliEn

Thanks for your attention!