

Seamless resources: accessing grid and cluster computing as commodity in brain imaging

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Motivation

There is a strong critical mass in BI of the Portuguese research community that gave origin to the Brain Imaging Network. This network emerged from the consortium of the universities of Aveiro, Coimbra, Minho and Porto and already is funded in 81.3% of its predicted investment (~4.3 million €) for the first 5 years of operation by FCT.

Currently, as attested by several projects and recent conferences (e.g. MICCAI-grid), computing resources both for storage and computing for eScience networks are considered as essential resource that must be available.

BIN for the beginning was conceived as a user of such services and already is active in integrating grid within its IT structure. The main problem is that grid is not the ideal resource for all situations as it was initially designed for batch processing. When the response and interactivity are requirements solutions like local cluster computing, and more recently, GPU can be more effective (e.g. decrease bandwidth usage, dedicated processing).

The current project objective is to integrate within a "seamless" API both kinds of resources and enable (almost) automatic computing resources routing depending on the high level task required by workflows or direct user instructions. The project will already benefit from the in-house knowledge in the neuroscience area and in grid computing (e.g. g-Lite)

The BIN as "Rede Nacional de Imagiologia Funcional Cerebral (RNIFC)" is a FCT recognized and funded association that already has 5 year funding ensured. We think that PhD grants proposals for FCT funding can be well supported by BIN reasoning and have above average chances of success.

Objectives

- Implement a framework that allows seamless access to computing resources either grid or cluster computing.
- Integrate the computing services within BIN portal

Challenges

- Adapt "killer" applications to grid and/or cluster computing (e.g. FreeSurfer)
- Integration issues (e.g. OS, versions)

References:

IEETA/SIAS: <http://www.ieeta.pt/sias>

Brain Imaging Network: <http://www.brainimaging.pt/>

MICCAI-grid: <http://proton.polytech.unice.fr/MICCAI-Grid/program.html>

FreeSurfer: <http://surfer.nmr.mgh.harvard.edu/>