Portal-based Support for Mental Health Research
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Introduction

In Australia there are two major sources of competitive research funding:

- The Australian Research Council (ARC)
- The National Health & Medical Research Council (NHMRC)

Typical projects request funding for equipment (i.e. computers):
- This increases the size of the grant
- Machines are often underutilized

Typical projects request funding for travel:
- Distances in Australia can involve ~4,000 km

The ARC wishes to demonstrate to researchers that Grid technology provides a viable alternative:
- hence award of funding in 2005/06 to support sample projects
Schizophrenia Research

Schizophrenia is an illness suffered by 0.6 – 1.5% of the population
but, by its nature it affects many more (e.g. family, friends, carers)
Cost to the community is high (A$35,000 per patient per year)
Research into the cause centres on monitoring of brain function
through post-mortem studies of the brain tissue
through neuroimaging (e.g. MRI and fMRI)
Scans are not a routine part of treatment
they are expensive (>A$1,000 per scan)
they allow observation of function of living brains
There are multiple Australian groups with small scan collections
collecting these to form a critical mass would allow more definitive studies
The ARC has funded establishment of a Globus-based Grid to support such research
New NHMRC and Pratt Foundation funding will extend this infrastructure, including
collection of new data
Requirements

Collect a critical mass of brain scans

Abstract over differences in data format and resolution

Protect patient confidentiality

Be accessible to any authorized user with Internet access

Provide access to computational power

Develop wizards to speed set-up of similar systems

Use Globus Toolkit
A critical mass of brain scans

Collecting new data
  Funding has been provided to start the collection of new scans

Combining disparate collections from around Australia
  Abstract over different collections using GridFTP, RLS,
  and OGSA-DAI
  Users see a single data collection, though data actually located
  on many different servers
Abstracting over data format

Groups store scans in different formats
  - Machines may come from different manufacturers
  - May be run at a different resolution
  - Software used may require data in a certain form

Fortunately, most of these formats can be converted between each other
  - OGSA-DAI activities that support this conversion have been prototyped
Protecting patient confidentiality

Patient confidentiality is vital

- Ethics Approvals govern researcher behavior for each data collection and/or study
- The data collection must ensure compliance with Ethics Approvals

Absolute de-identification is not desirable because it would preclude application of helpful results to contributors

- An over-seeing Board will facilitate result -> patient activity

CAS can provide support for role-based access control

- GridFTP has built-in support
- OGSA-DAI can be extended to have support
Provide access to any authorized user

Any authorized user should be able to access the system provided they have an Internet connection

Use of a Web portal does not require special software on client machines

Gridsphere with GridPortlets (and GT4Portets) gives access to required Grid services

PURSe portlets added to make credential management transparent to researchers
Support for CAS added
Providing access to computational power

WS GRAM allows jobs to be executed through Globus
  Users need to choose which machine will run any given job

Gridbus Broker automatically selects which compute server to use
  Users simply start the job and don’t worry about where it will be run

Sample portlets exist
  Require users to enter XML description of the tasks to be performed
Wizards to ease set-up of similar systems

We are developing a wizard to create portlets for common workflows using the Gridbus Broker

- Easier to use interface for researchers
- No need to learn XML format required by the Broker

We will also build a wizard to help access OGSA-DAI resources

- Have already developed simple OGSA-DAI portlets
- Need to improve their support for security
Current state of the project

A pilot implementation exists linking separate networks located in Newcastle, Australia

This is termed the ASRB Grid

The ASRB Grid provides secure access to data stores distributed across these sites

Rudimentary support for distributed computation is available

Incorporation of specialised software into new sites is aided by existence of wizards

Work has commenced on development of data analysis tools and their incorporation into the Grid infrastructure

Collection of new data is due to commence in early 2007, requiring

Commissioning of a new server

Set-up of a new Certificate Authority with full security functionality to replace the current test Authority
The future

Sites from all around Australia will be added to the ASRB Grid

Talks have begun to incorporate UCLA in early 2007

Will be “the world’s biggest online collaborative mental health research facility”
Questions/Thank you etc.