

The Development of Data Grid Environment for Neuroinformatics — Architecture

Approach

The essentiality of neuroinformatics is development and sharing of neuroscience databases, tools and numerical models. For the purpose, we recognize that fundamental methods are data description, accumulation and distribution as the basis of data sharing.

Data description

To handle heterogeneous data acquired from various experimental devices, interfaces which expose data to grid environment play a significant role. Such interfaces are required to be able to describe how target data are described and should be accessed. This information can be stored as XML documents into DBMSs.

Data accumulation

In neuroinformatics, data accumulation should be accomplished with DBMSs to support various data access style. Moreover, costs of data input should be reduced. We are currently developing MEG (Magnetoencephalography) data transfer system that automatically store data into database. MEG is a device which can detect the change in minute magnetic fields generated from the brain activity.

Data distribution

In data distribution (or providing interfaces to database), the most important point is to share commonly used APIs among the interfaces to databases. This reduces costs of application development. We are currently exploring OGSA-DAI and Globus Toolkit 3. These tools are compliant with standard web service technologies and will be widely used in the next generation of grid computing.

SC2002 Demonstration

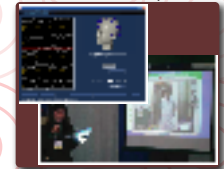
We demonstrated our MEG data transfer system in SC2002 at Baltimore, U.S.

Osaka, Japan (AIST-Kansai)



MEG

Baltimore, U.S.



Design Strategy

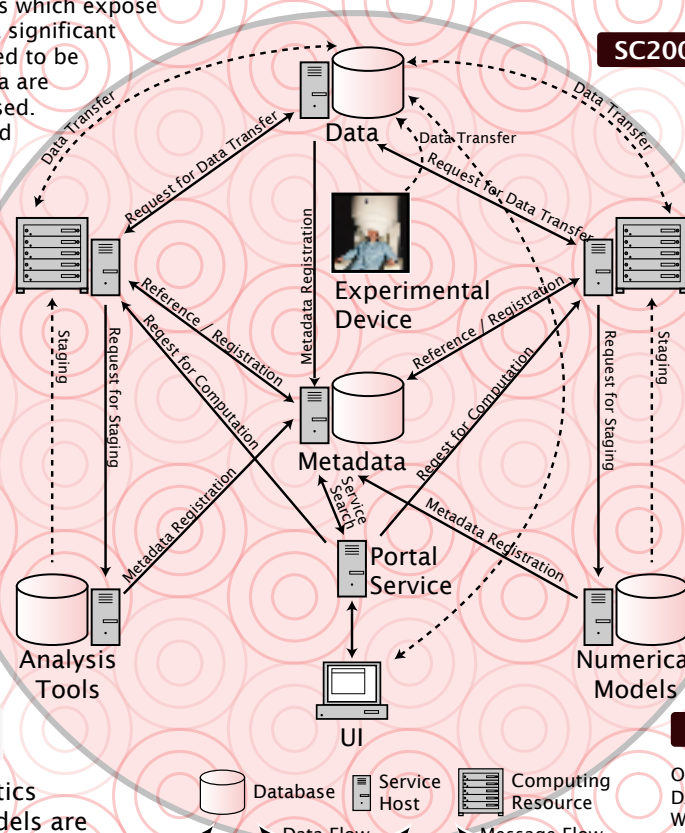
Resources of neuroinformatics such as data, tools and models are located in various research institutes. We focus on metadata-driven access and service oriented grid environment as key technologies for organic linking of various resources.

Metadata-driven access

Metadata takes a central role in our framework. All the data, tools and models are explained with metadata formatted as XML document. Users' requests for computation are processed by Portal Service, which retrieves information about appropriate resources and organizes them.

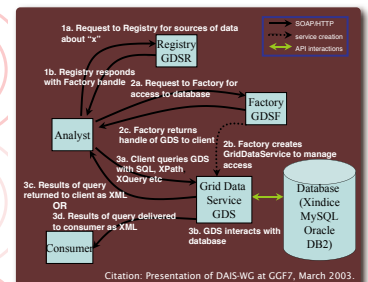
Service-oriented grid environment

In widely distributed grid environment, data and metadata should be provided through commonly accepted interfaces. Currently we are examining Globus Toolkit 3 and OGSA-DAI in terms of their functionality, working speed and so on.



OGSA-DAI

OGSA-DAI, which is under development at DAIS (Data Access and Integration Service) WG in GGF, provides a uniform framework for access to databases on the Grid. This tool enables us to use conventional SQL statement and XML search language such as XPath without any extra modification. We envision that OGSA-DAI will be adopted in many domains involving grid and DBs.



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bioGrid project
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