

# ENABLING THE SHARING OF FUNCTIONAL MRI DATASETS WITH BAXSQL

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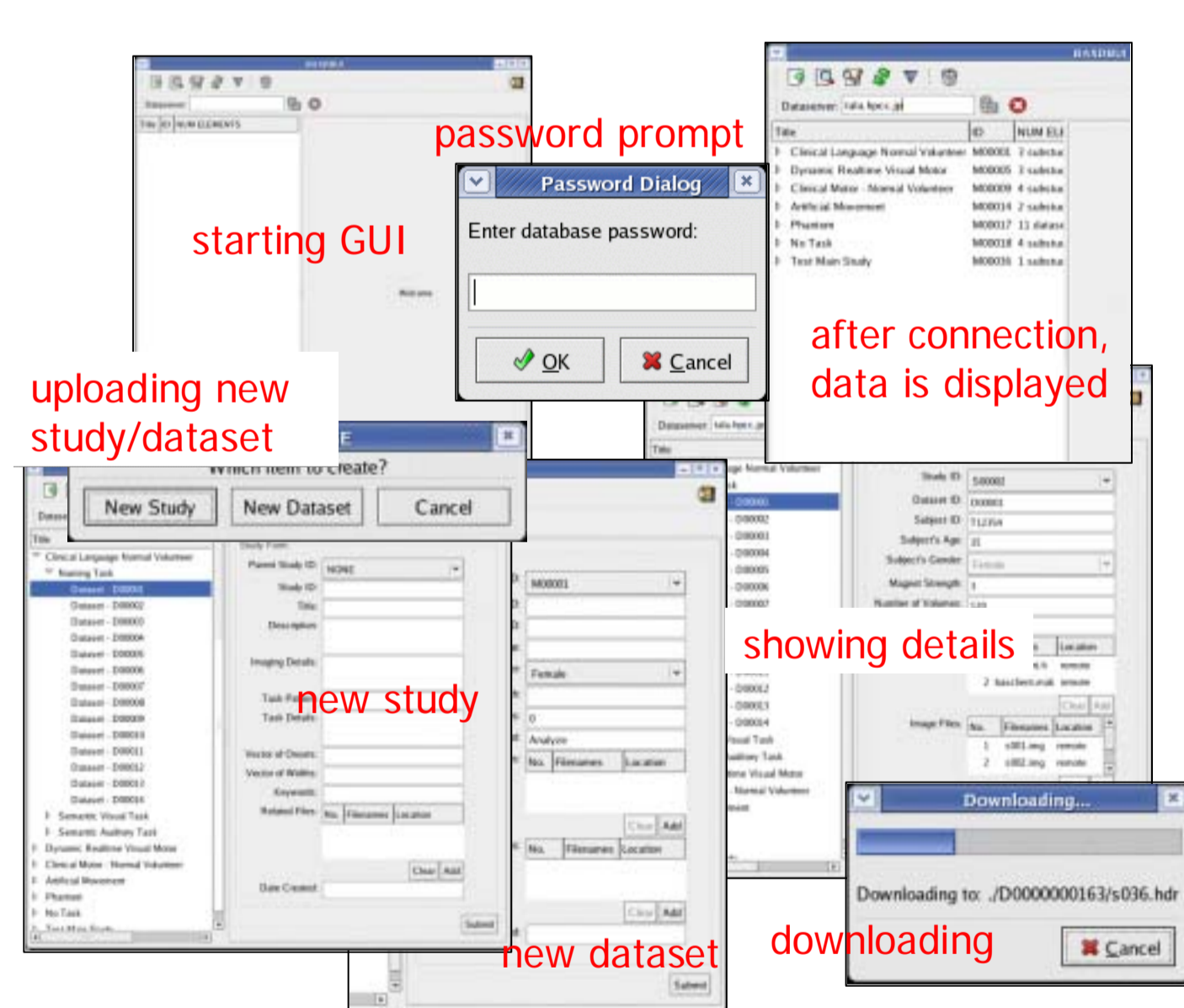
## BAXSQL

BAXSQL is a software package developed for the Medical Grid Project that enables the sharing of functional MRI datasets from across different research laboratories. Instead of utilizing a centralized data server for a common data storage, BAXSQL enables access to federated data sources available from different research groups. With BAXSQL, each group retains control of who can access its datasets. Access privileges can be granted or revoked by resource owners.

BAXSQL is built on top of the Ninfg (http://ninf.apgrid.org/) and Globus Toolkit (http://www.globus.org/) grid middlewares. BAXSQL is freely available and can be downloaded from the Medical Grid Project website (http://www.medgrid.org/).

## BAXSQL GUI

With BAXSQL, users interact directly with the provided graphical user interface (GUI), enabling a more intuitive approach to the management of distributed and remote datasets. This client application runs locally in the user's machine and provides an interface for uploading data sets from the client machine to remote data servers, downloading data sets from remote data servers to the local machine, among others.

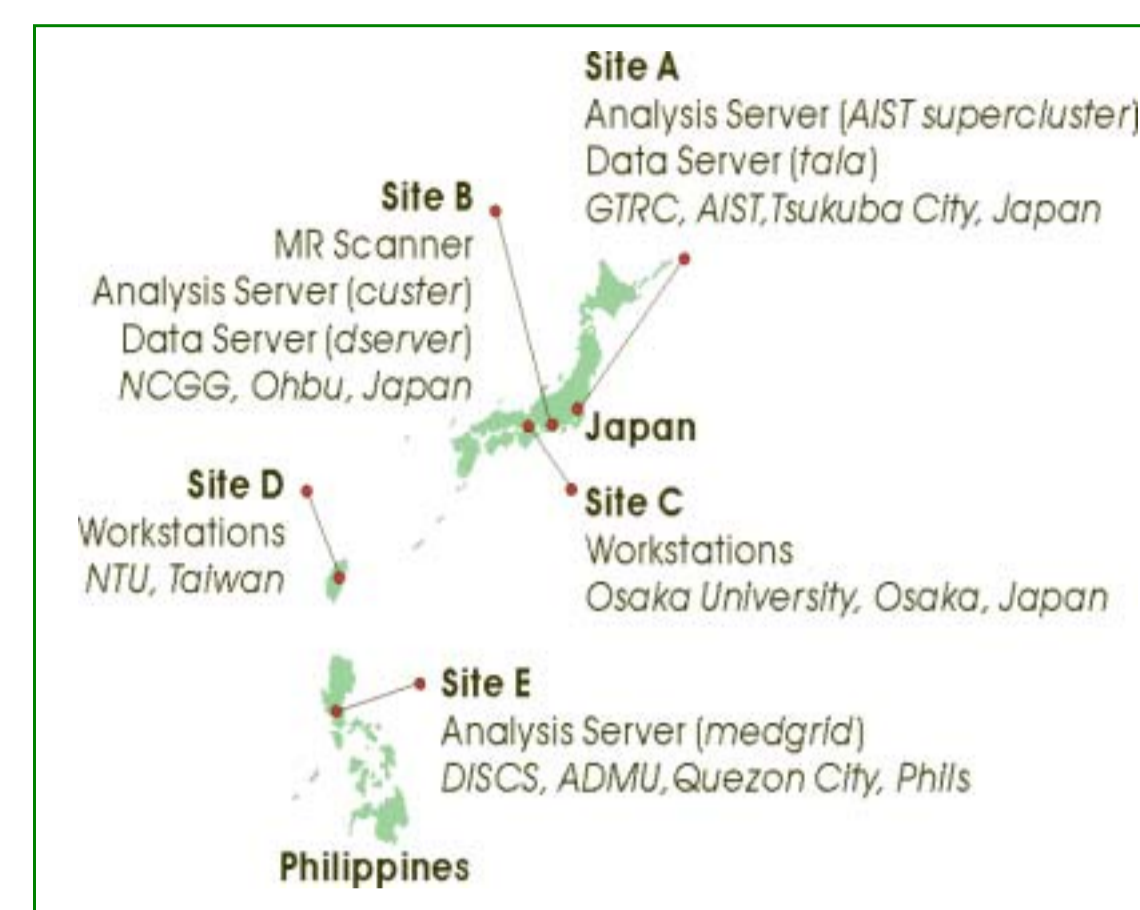


“BAXSQL is GUI-BASED making its operation more intuitive and user-friendly”

## FEATURES

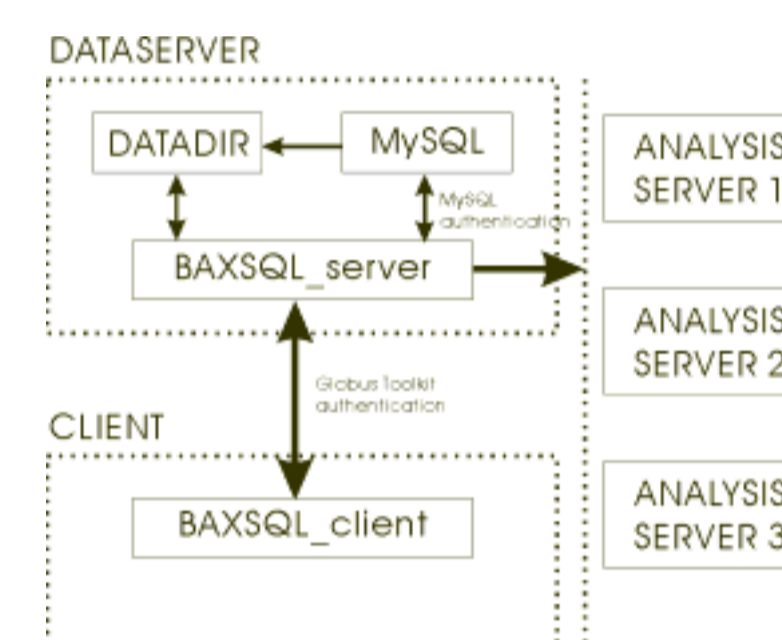
- **Grid-based** functional MRI data management tool
  - ✓ Management
  - ✓ Processing
- **Simultaneous and transparent** access to multiple data servers
- User friendly, **GUI-based**
- Currently runs only on Linux

## Medical Grid Project

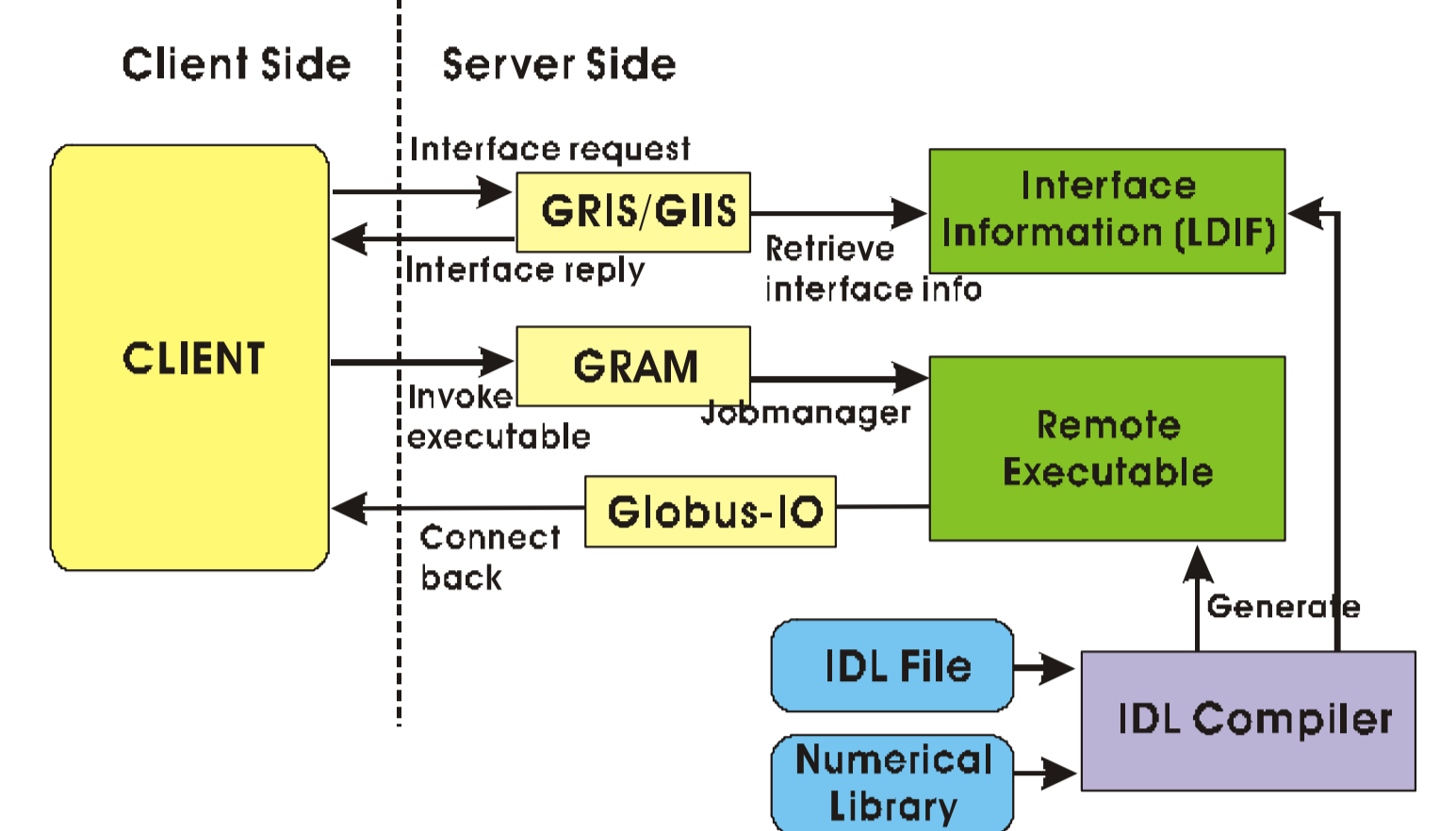


BAXSQL enables the sharing of fMRI datasets among Medical Grid Project participating sites.

Interaction of the different BAXSQL components



## Ninfg Architecture



## A CLIENT—SERVER ARCHITECTURE

BAXSQL implements a client-server architecture with the Ninfg middleware providing the necessary infrastructure. The Ninfg client library provides the GridRPC API for BAXSQL's client component. This component controls the execution of server programs called remote executables in remote data servers.

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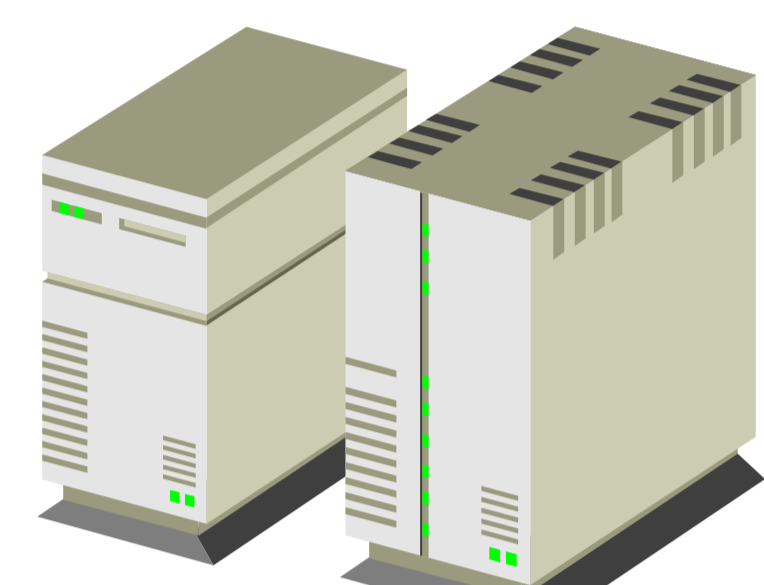
## DATA SERVERS

The server application runs in remote data servers. It manages the storage of the data and a backend database containing metadata. BAXSQL also supports several predefined functions that users can invoke to perform standard fMRI analysis such as realignment, smoothing, and general linear model based statistical analysis. Another key feature we've implemented is the use of remote analysis servers, if available, to do the actual processing of these functions instead of the data server itself.

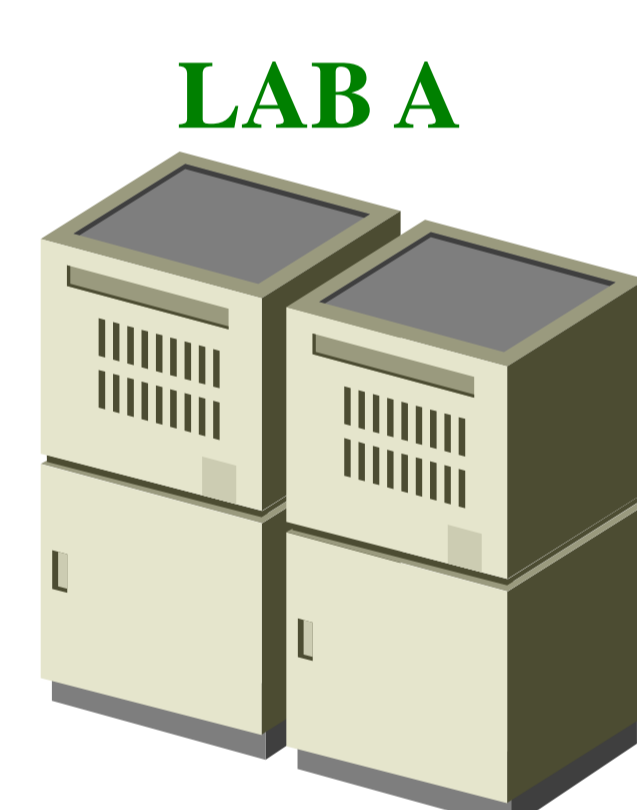
## SUMMARY

BAXSQL:

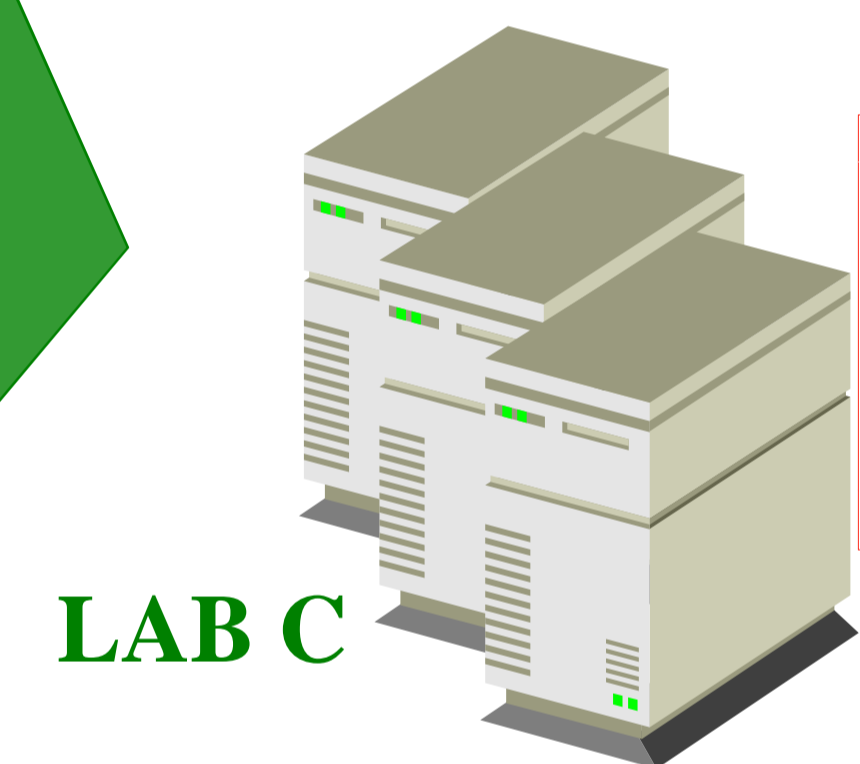
- Provides **flexible fMRI data management tool** in a grid environment
- **Simplifies the analysis** of fMRI datasets by incorporating useful predefined functions
- Provides **significant reduction in analysis time** using remote high performance computational resources
- Uses Ninfg to make **transparent access** to distributed data and analysis servers
- **Hides the complexities** in maintaining and using high performance computational resources



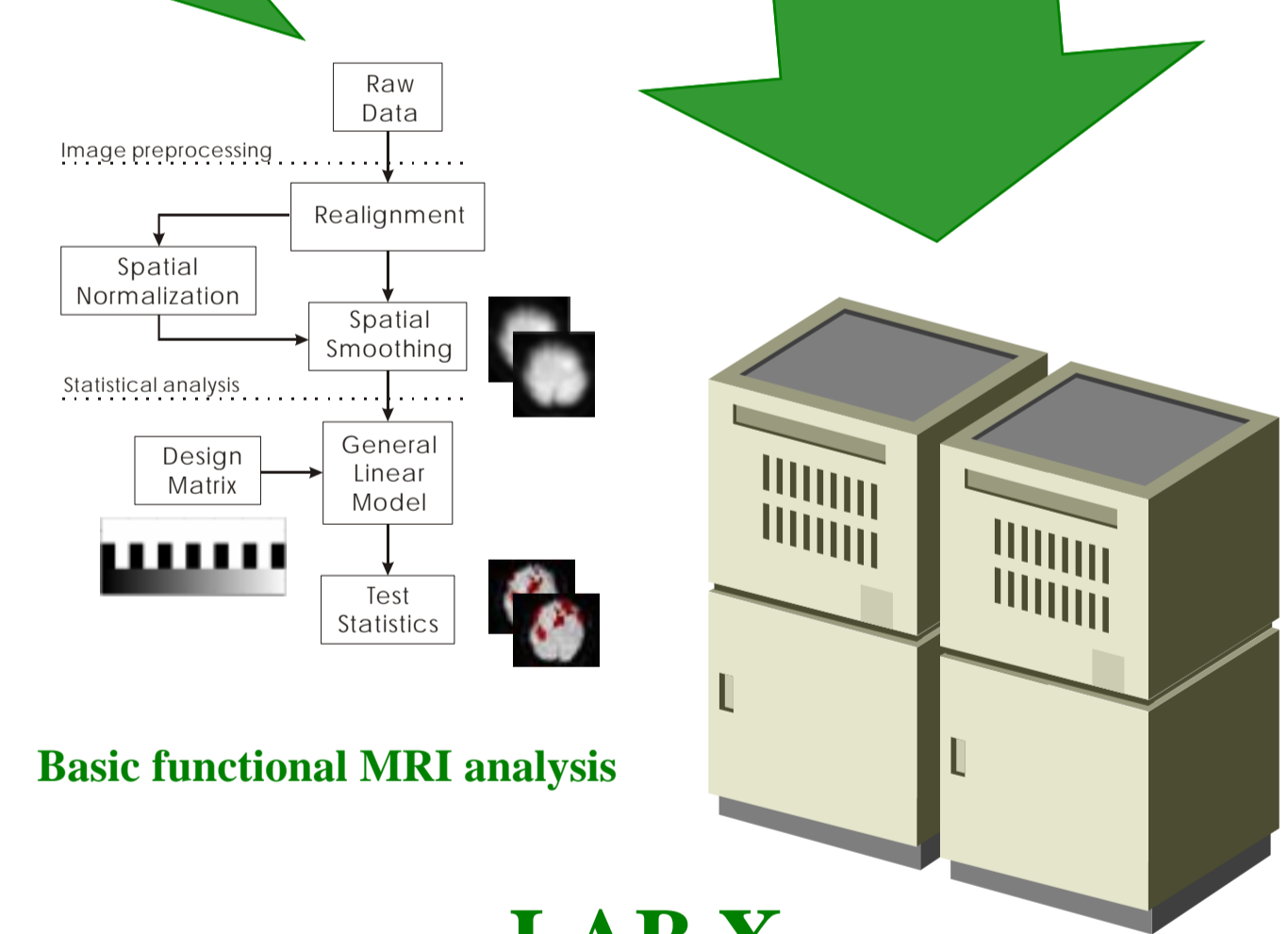
LAB B



LAB A



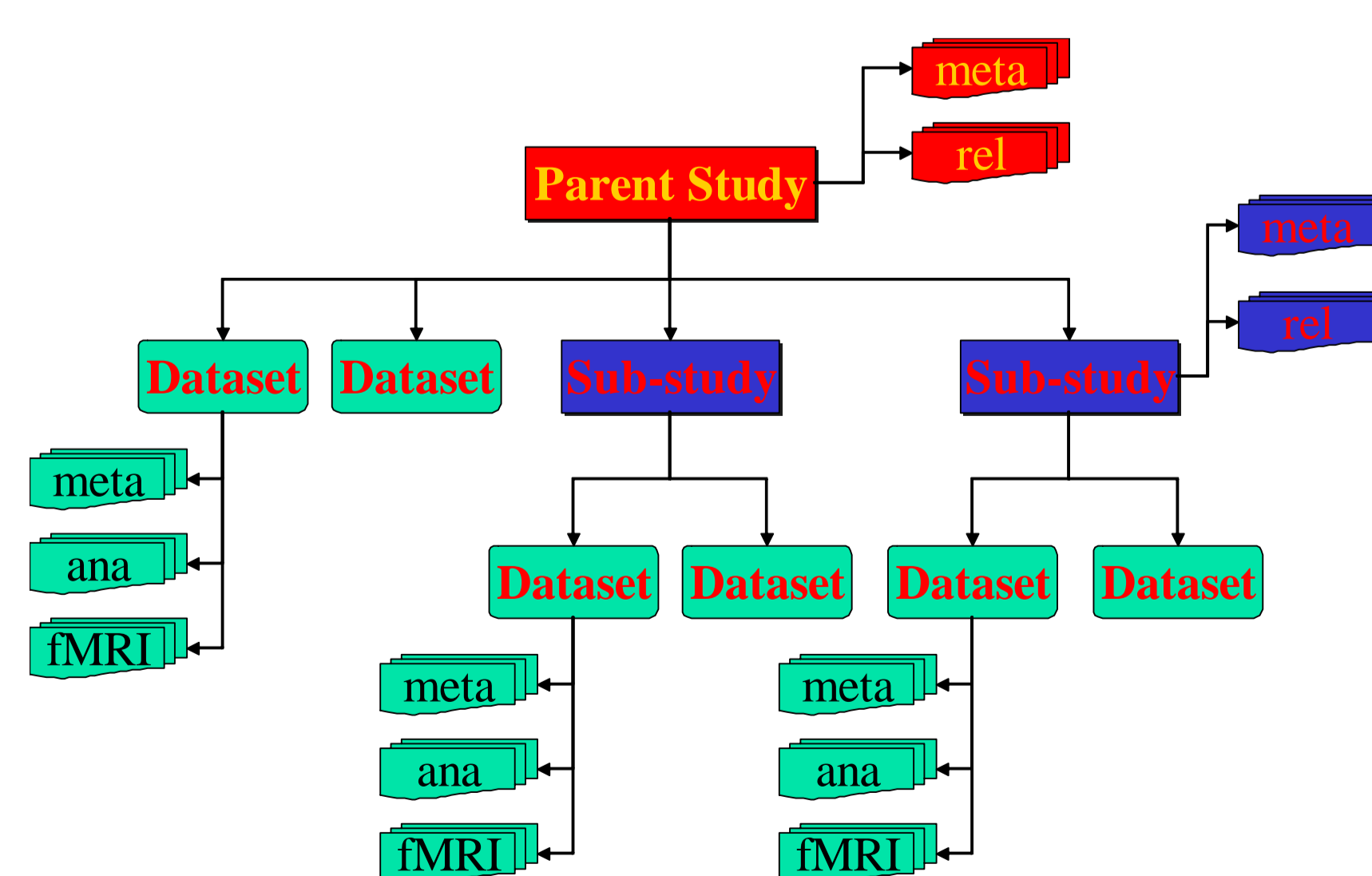
LAB C



Basic functional MRI analysis

LAB X

“BAXSQL enables simultaneous and transparent access to distributed functional MRI databases”



“BAXSQL has a flexible data structure for easier integration to existing infrastructure”