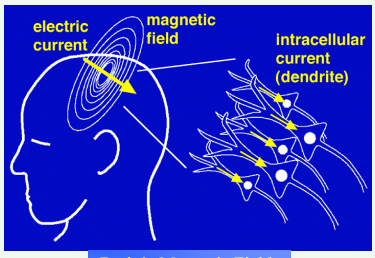
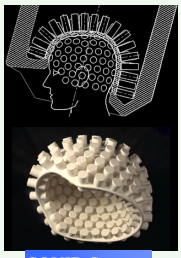
MEG: A Medical Measurement Device

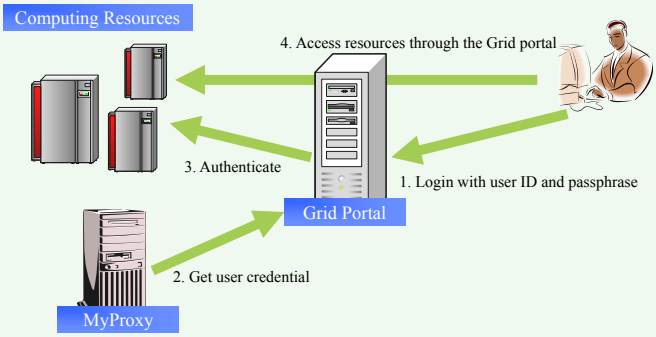
Magnetoencephalography (MEG) is a measurement device that has the capability of capturing the change in magnetic fields generated by activities of neurons in brain. Superconducting Quantum Interference Device (SQUID) sensors are used to measure these magnetic fields.



Brain's Magnetic Fields


SQUID Sensors

http://www.ctf.com/



Grid Portal

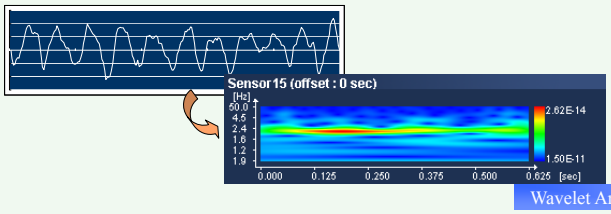
The grid portal hides the complexity of the Grid and provides users with a transparent accessing way to the computational resources of the Grid. This system enables single-sign-on by making use of a MyProxy server. MyProxy server is a key repository server which stores user credentials of X.509.

Method of Analysis & Visualization

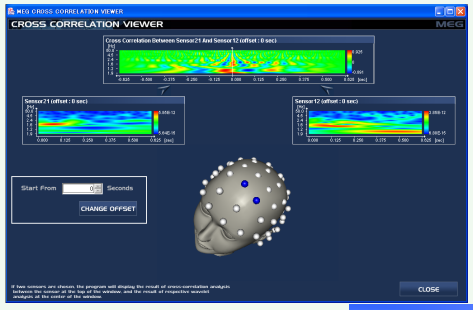
We use wavelet analysis and wavelet cross-correlation analysis as analysis methods for MEG data.

Wavelet analysis is one of the time frequency analysis. The brain signals are decomposed into frequency components over time.

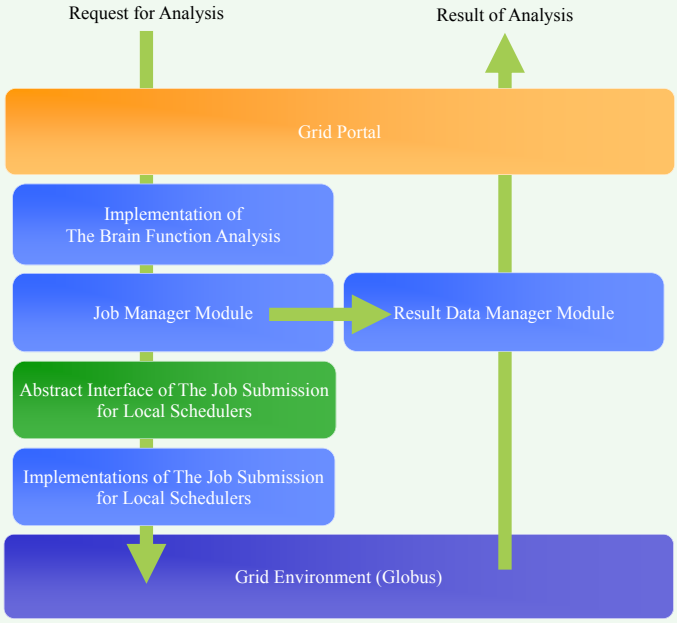
Wavelet cross-correlation analysis provides characteristics on "similarity" between two brain signals with respect to frequency components. The information of characteristics helps doctors to specify the signal source of interest. Doctors and researchers are able to understand the time lag between frequency components, and the propagation directions of brain waves.



Wavelet Analysis



Wavelet Cross-Correlation Analysis



Priority-based Queueing Mechanism

With this mechanism, users can analyze data region of interest, such as the region where epileptic wave seems to appear, preferentially in comparison with other data regions. The Job Manager Module manages the status of jobs. When the job terminates, the Job Manager automatically generates the result data information that contains priority. This enables user to get the data of interest from the result data by priority.

Abstraction for Local Schedulers

With this abstract interface of the job submission, the priority-based queueing mechanism can achieve portability in the Grid environment.