

Biogrid project in Japan



~ For accelerating Science and Industry ~

Graduate School of Information Science and Technology,
Department of Bioinformatic Engineering, Osaka University

Susumu Date



This talk is...

- What is Biogrid project ?
 - Project goal
 - Project framework
 - Budget
 - Application
 - Grid environment being developed
- Two Application Examples
 - Life-electronics (MEG- Grid project)

What is Biogrid project

- A project in “IT Program” promoted by MEXT (Ministry of Education, Culture, Sports, Science and Technology), in Japan.
 - A project towards “E-Japan”
- A project led by Cybermedia center, Osaka University, Japan
 - Project leader: Prof. Shinji SHIMOJO, Deputy Director of Cybermedia center
<http://www.cmc.osaka-u.ac.jp/e/index.html>
- A 5-year project driven mainly in Kansai area.
- Project budget 550 million yen= approximately 4.5 million dollars / yr.
Totally 4.5 million dollars x 5 = 22.5 dollars

Why cybermedia center?

- Rich practical experience of administrating High performance computers
- Has started with grid research since 1996
- High-speed Network hub
 - Super SINET (Science Information Network)
10Gbps
 - Japan Gigabit Network (JGN)
1Gbps



NEC SX-5/128-M8
1192.00 GFlops

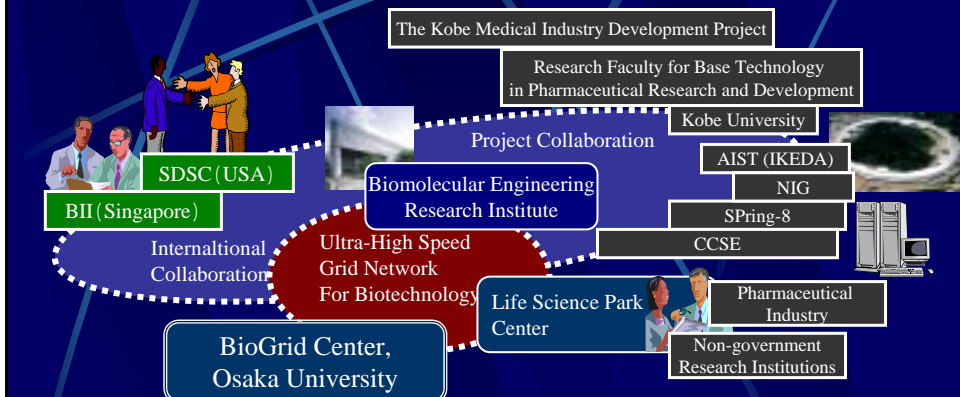
Why Kansai Area?

- Many researchers are working for Bioinformatics and Medical fields in pharmaceutic companies, universities, and scientific institutions in Kansai Area.
- Active research on Bio-related Database
 - PDBj-ML (Institute for Protein Research, Osaka univ)
 - Genome XML (Graduate School of Engineering Science, Osaka Univ.)
- Their researchers have advanced technologies and knowledge on Life science.

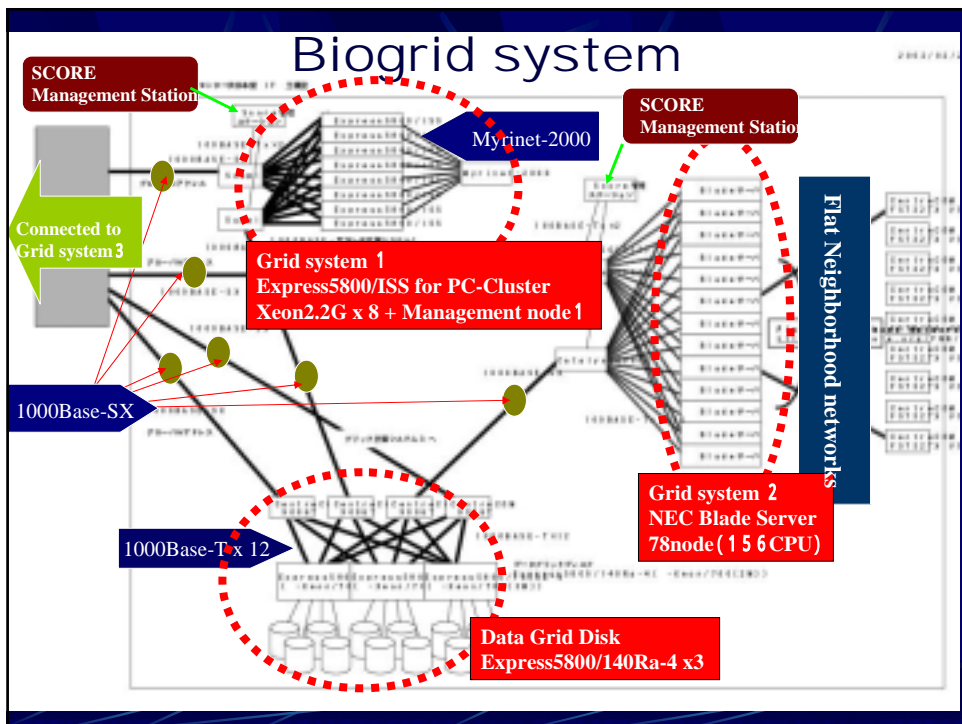


Biogrid project aims to accelerate the research and development in Bioinformatics and Medicine through Grid for sharing of information and knowledge among researchers.

Project Framework



- Project collaboration
- International collaboration

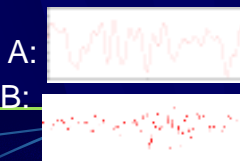
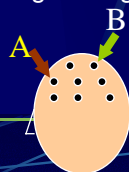


Ex.1 Life-electronics Project (MEG-Grid Project)

- Osaka University, AIST(ikeda), and NTU
- Aim to realize research infrastructure for future brain science
 - Sharing of knowledge and technologies relative to the analysis of brain function
- MEG (Magnetoencephalography)
 - Achieve both **non-invasiveness** and **high degree of measurement accuracy**



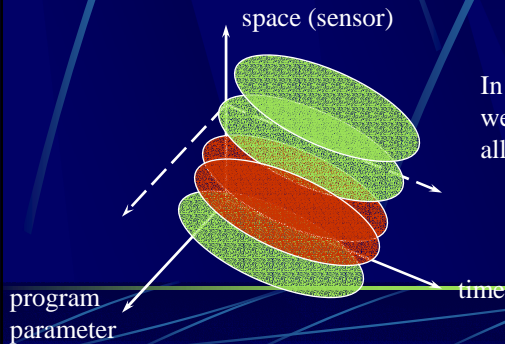
cf. EEG (Electroencephalography), ECoG (Electrocorticography)
 measure functional data on multiple points around the head
 promising among medical doctors and brain scientists.



Why is Grid necessary for MEG Data Analysis?

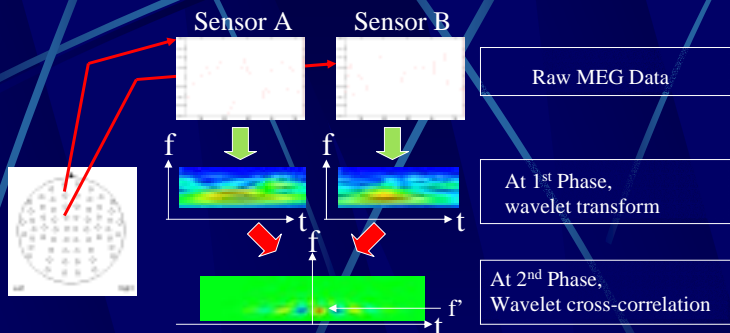
- MEG Data Analysis can be classified into a class of inverse problem, which class requires much computational power.

▣ The computational space of inverse problem is large and the whole space needs to be explored for problem solving.



In the analysis of brain functions, we need to choose the best solution out of all possible solutions.

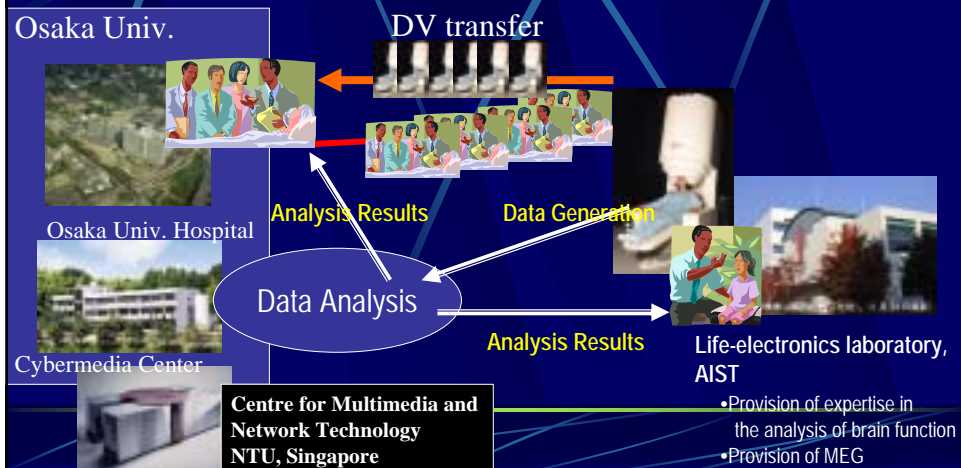
Wavelet cross-correlation analysis



This image indicates that a brain signal with frequency f' was detected earlier in Sensor B than in Sensor A.

- This analysis procedure needs to be performed for each pair of MEG sensors. E.g. 64ch \rightarrow 2016

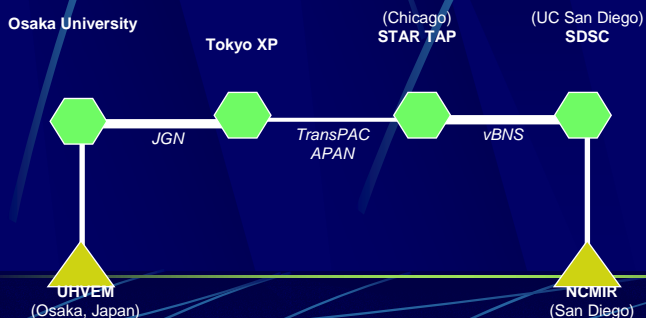
MEG data analysis on Grid



Ex 2. High Resolution DV over IPv6

Sharing of UHVEM (Ultra High Voltage Electron Microscopy) in Osaka University with NCMIR (National Center for Microscopy and Imaging Research)

- 3 Million electron volts
- the most powerful microscopy



iGrid 2002 Amsterdam Demonstration



Demonstrate Advanced features of the Telescience Portal:

1. Perform Telemicroscope controlling the IVEM at NCMIR and the UHVEM at Osaka University.
- Digital Video is broadcast at 10fps over a dedicated IPv6 network between San Diego and Amsterdam as well as between Osaka and Amsterdam.
2. Data will be computed with distributed resources within NCMIR, NFACL, NCHC, and Osaka University.
3. Render and visualize data in Amsterdam using distributed resources in NCHC.

For detailed information, pls. contact: Mark Ellisman, Abel W Lin (SDSC)
Fang-Pang Lin (NCHC), Toyokazu Akiyama, Shinji Shimoi (Osaka Univ.)

Conclusion

- Biogrid project has just launched from this year.
- Cybermedia center Osaka Univ. has taken a role of importance in Biogrid project promoted by MEXT.
- Now we are seeking collaborations for future research infrastructure with Grid.

Acknowledgements

- Thank you for giving the opportunity of this talk in GGF.
- Biogrid project has been supported by all members in APGrid <http://www.apgrid.org> and PRAGMA <http://www.pragma-grid.org>.
Osaka University also appreciate Apgrid and Pragma Grid societies.