



INTENDED USAGE OF GARUDA-GRID BY PRL

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Physical Research Laboratory was established by Prof. Vikram Sarabhai in 1947 for research in the field of Cosmic Rays and Atmospheric Sciences.

Scientific Divisions:

- 1. Astronomy and Astrophysics**
- 2. Space and Atmospheric Sciences**
- 3. Planetary and Geosciences**
- 4. Planetary Sciences and Exploration (PLANEX)**
- 5. Theoretical Physics**



- ❖ MOU signed between PRL, C-DAC and ERNET on 3rd February 2006
- ❖ The Garuda Network connectivity to PRL was established in June 2006
- ❖ PRL will provide computing cluster (64 or higher CPU) to GARUDA [PRL and C-DAC are jointly working to finalize the configuration]
- ❖ One Linux machine acting as a gateway is providing Garuda Grid access to PRL scientists
- ❖ 5 scientists and 2 system administrators are currently having account on GARUDA Grid

Planned Applications on Garuda Grid



❖ **ATMOSPHERIC SCIENCES:**

- **Modeling of Regional and Global Climate Effects of Aerosols**
 - ISRO Geosphere Biosphere Programme project
 - PRL Scientists, in collaboration with IIT-B and C-DAC
 - Plan to use a Global Climate Model (GCM)
 - Long term simulations(50 to 100 years) are proposed to be carried out
 - requires 30mts execution time for each simulation day using 16 processors machine
- **Global Modeling of Atmospheric Ozone and Trace Gases in the Troposphere with Emphasis on Tropical Regions**
 - one need large storage space
 - It takes 7.5 hrs for one year simulation on 64 IBM Power5 CPUs.

Planned Applications on Garuda Grid



❖ ASTRONOMY:

- **Analysis of Data from Surveys of the Milky Way**
 - Analysis of large volumes of data from surveys of the Milky Way require large amount of disk space for the basic catalogs, intermediate products and final processed results.
 - This comes nearly a tera bytes at present but the long term requirement is few tens of tera bytes.

Planned Applications Garuda Grid



❖ THEORETICAL PHYSICS:

• **Cosmology: Modeling Inflation**

- The codes here takes a very long time on single a single processor machine and hence need the cluster available on grid

• **Classical and Quantum Simulation of Low-Dimensional and Time-Dependent Chaotic Systems**

- Compute Intensive
- A simple classical simulation in this work takes about 11 hrs on a 1TF machine
- For the quantum simulations one has to diagonalize matrices of the order of 30000 or more
- More realistic calculations will need at-least 5-10TF

Planned Applications Garuda Grid



- **Synchronization in Models of Neuronal Networks**
 - active area of research due to its connections with questions about connectivity in the brain, functional organization of the brain etc.
 - This project requires computing power of the order of the 5TF
- **Many-body Calculations for Heavy Atoms for Parity and Time-Reversal Violation and for Many-Body Chaos**
 - Calculation involves solving 10^7 coupled non-linear algebraic eq.
 - it is estimated that moderate calculations require 15 days of CPU time on Intel Xeon 2.7GHz
 - diagonalizing Hamiltonian matrices of 10^5 dimensions

Planned Applications Garuda Grid



- **Chaos, Two-body Ensembles and Statistical Nuclear Spectroscopy**
 - For interacting fermion systems studied by PRL group using IBM RS/6000 SP and POWER5 machines the computing time, for constructing and diagonalizing Hamiltonian matrices, ranging from 4-20hrs for 5-20 member ensembles with number of particles 4-8 and single particle states 8-16
 - Calculations for more realistic applications require a TF machine.

PRL GARUDA Contact Detail



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Thank You