Garuda Partners Meeting Summary

The First Garuda Partners Meet was held on 12th & 13th December 2005 at Bangalore. The objective of the meeting was to brief the Grid partners on the progress of the initiative and mutually set expectations for the roll out of Garuda – The National Grid Computing Initiative in its proof of concept phase. The meeting was to provide an overview of grid computing and place in perspective the Garuda initiative. The modalities of participation in the proof of concept phase of Garuda were presented to the partners.

Sh. S. Ramakrishnan, Director General of C-DAC, welcomed the partners. He presented his vision for Garuda to be able to provide anytime, anywhere access to supercomputer processing power and other computational resources for all researchers in India. He stressed on the need for collaborative research among scientific & engineering community across various academic institutions and other centres of scientific excellence in the country. He described C-DAC's leadership and commitment in the development of high performance computing systems and identified C-DAC's lead role in grid computing as a thrust area to further interests of the scientific and engineering community.

Sh. Ramakrishnan identified the main deliverables of Garuda in the POC phase in delivering a high-speed communication backbone and aggregation of geographically distributed resources by way of compute, data, storage, software and scientific instruments, and research and engineering of technologies, architectures, standards and applications in high-performance computing and grid computing.

Professor N. Balakrishnan, Associate Director of Indian Institute of Science, was the honoured guest and spoke briefly on the need for a collaborative mindset in solving challenging scientific problems. He described his views on the approach that needed to be taken by the partners on collaborative research and the inhibitions that needed to be shed especially with respect to the security issues on the Grid in this experimental phase of the initiative. Prof. Balakrishnan formally launched the Garuda website www.garudaindia.in.

Mr. S. P. Dixit, Programme Co-ordinator, C-DAC, Pune provided an overview of C-DAC's current efforts in High Performance Computing and presented a roadmap to deliver a 5 Teraflop computer in the second half of 2006.

Dr. B. Prahlada Rao (C-DAC Bangalore) and Dr. V. C. V. Rao (C-DAC Pune) presented a technical overview of Grid Computing. Their talk highlighted the relevance of Grid computing and spoke of various challenges in this mode of computing which transcends geographical and organizational barriers among the contributed resources.

Mr. N. Mohan Ram, Chief Investigator of Garuda, gave a brief update on the project including the deployment of the network and described C-DAC resources at Bangalore, Pune and Chennai which he said would be made available on the grid. He also described the functionalities of the Grid Monitoring and Management Centre to be housed in C-DAC, Bangalore. Mr. Mohan Ram also said that the alpha version of the access portal

was ready and work on its integration with the grid scheduler was progressing well. He added that the local area grid deployment was being studied in Bangalore and Pune. He said that C-DAC's Param Padma supercomputer would be the primary engine for Garuda in the POC phase.

Mr. Deepak Singh, Director, ERNET, described that the communication infrastructure for the project would be deployed by ERNET, an autonomous scientific society of the Department of Information Technology that provides large-scale network services across the country, in association with Sify Ltd. Mr. Ashish Hastak of Sify Ltd., portrayed the deployment road map for the communication fabric, listed the site requirements and defined the responsibility of the grid partner and the assistance required from each of the partners in the last mile/premises roll out.

Dr. Saragur Srinidhi of Prometheus Consulting retained by C-DAC as a consultant on the Garuda initiative described the modalities of signing onto the Garuda network for the partners. He engaged the partners in an interactive session on issues related to the Memorandum of Understanding (MoU) and the Acceptable Use Policy on the Garuda network. He moderated discussion on issues pertaining to partnership categories, contribution of resources, mode of payment and acceptable use of Garuda resources. Partners who would not be able to make cash payment towards the membership fee were provided an alternate proposal wherein they could procure a HPC cluster and agree to contribute a set percentage of the computational power of the HPC system. The configuration of the HPC cluster to be provided by partner institutions was correlated to the partnership categories.

Sh. Ramakrishnan directed an open session with the partners and responded to a host of questions, concerns and suggestions from the partners. The discussion was focussed on the financial and other hard commitments for the network roll out at partner institutions. Prof. S. C. Dhawan of PEC Chandigarh, in response to concerns from some partners on financial commitments to the Garuda effort, spoke at length on the need for much required innovative spirit in the science community across India and advised the partners to ‘invest’ in this program for greater gains, in the long run, for all institutions.

Dr. Rajkumar Buyya, University of Melbourne, an authority in Grid Computing presented an evening lecture on the economic models for Grid Computing systems.

The Second day of the meet began with the Director General summarising the proceedings of the previous day for the benefit of the partners and members who had joined the meet on the second day.

Dr. Subrata chattopadhyay C-DAC, Bangalore, who had circulated a template for the partners feedback earlier during the first day, addressed specific issues brought to the fore by the partners and moderated a discussion on Partners feedback.

Dr. P K Sinha and Mr. Seetharamakrishna, C-DAC, Pune presented issues related to resource collaboration and described the types of resources expected on the Grid.

Dr. R Govindarajan, Chairman of SCRC, IISc Bangalore chaired the session on applications being researched by Grid partners.

Dr. Haresh Bhat of Space Applications Centre (SAC), ISRO Ahmedabad gave a presentation on *Satellite Based Grid Technologies***.** He discussed the scope of the project, its relevance to Grid computing, the goals, the challenges to extend the grid to remote locations, the technology involved in the development of the same, case studies etc.

Dr. Tapan Misra, SAC, Ahmedabad, gave a presentation on the Natural Disaster Management System using Synthetic Aperture Radar and how the grid could be effectively utilised to mobilise data and apply it to the relevant tools. The results would then be used effectively and the grid could be used to disseminate timely information to the places likely to get affected.

Dr. Thamarai Selvi from MIT Chennai, gave a presentation on development of front end tools for Semantic Grid services. She discussed the objective, and the relevance of a layered architecture & research issues relevant to the topic. She also explained the tools required for semantic search; limitations of OWL & the proposed architecture for the endeavour including the future work in that field.

Prof. C.S Kumar, IIT, Kharagpur in his presentation covered the HPC, Grid and Collaborative Computing on the campus and the facilities therein. Activities on test bed at IIT Kharagpur, video conferencing over IP and QoS enabled network, collaboration using AccessGrid & Video conferencing using Access Grid was presented.

Dr. Rajendra R. Joshi, C-DAC, Pune in his presentation covered points related to the Genome Grid which is a Grid Portal for Bioinformatics Applications, its objectives, features, tools used etc. He discussed the Protein folding which was computationally intensive and the need of grid computing in bioinformatics. He also discussed the Smith-Waterman algorithm, Java Commodity grid, MySql relational database management system, Application specific scheduler component, Flow chart of the Application specific scheduler algorithm and Future direction.

Dr. S.K Misra, SGPGI, Lucknow in his presentation discussed the points related to developing core competence in TeleHealth – a SGPGIMS initiative. He presented the HIS system which was built in collaboration with CDAC, its objectives, the current status of program and various other features related to the institutions initiatives.

Dr. B.S Jagadeesh, BARC, Mumbai in his presentation discussed the Grid Computing at BARC, the motivation, current Status, DAE Grid, International Collaboration with LCG, Products Developed and most importantly BARC's perspective of Garuda.

Dr. Dinesh S. Katre, Group Co-ordinator C-DAC, NMRC, Pune discussed the Grid enabling of JATAN: Virtual Museum Builder.

Dr. Yashwant Gupta, of NCRA, TIFR, Pune gave a presentation on the activities of NCRA and the possible application collaboration on Garuda.

Sh. Ramakrishnan summarised the proceedings of the meeting and gave a quick peek into the future plans and sought the cooperation of the partners in realising the vision of PoC Garuda. He welcomed PEC Chandigarh and IGIB, New Delhi as two new additional members of the GARUDA Initiative.

The list of partners who had representatives attending the meet:

1. Institute of Plasma Research, Ahmedabad
2. Physical Research Laboratory, Ahmedabad
3. Space Applications Centre, Ahmedabad
4. Harish Chandra Research Institute, Allahabad
5. Motilal Nehru National Institute of Technology, Allahabad
6. Indian Institute of Astrophysics, Bangalore
7. Indian Institute of Science, Bangalore
8. Madras Institute of Technology, Chennai
9. IIT, Delhi
10. Guwahati University
11. IIT, Guwahati
12. University of Hyderabad
13. Centre for DNA Fingerprinting and Diagnostics, Hyderabad
14. Jawaharlal Nehru Technological University, Hyderabad
15. IIT, Kanpur,
16. IIT, Kharagpur,
17. Central Drug Research Institute, Lucknow
18. SGPGI, Lucknow
19. BARC, Mumbai
20. NCRA, Pune
21. University of Pune
22. IIT, Roorkee
23. Regional Cancer Centre, Thiruvananthapuram
24. VSSC, Thiruvananthapuram

In addition to the above, the meet had representatives from:

- Punjab Engineering College, Chandigarh
- IGIB, New Delhi.
- DIT, Delhi
- C-DAC Centres
- ERNET

Talks and Presentations delivered at this workshop are available on www.garudaindia.in