Seamless, Scalable Computing from Desktops to Global Computational Power Grids: Hype or Reality?

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Abstract

The growing popularity of the Internet along with the availability of powerful computers and high-speed networks as low-cost commodity components is changing the way we do (high performance) computing and the emergence of two advanced computing themes: "cluster computing" and "global (network) computing" (grid computing). This technology opportunity enables the clustering or coupling of a wide variety of geographically distributed resources such as desktop computers, clusters, storage systems, data sources, and scientific instruments, and allows them to be used as a single unified resource and thus forms what is popularly known as “computational (power) grids”. In this talk we raise a number of open challenges that cluster computing and the grid researchers and developers need to address.

The presentation focuses on challenges in building commodity computational grids and computing portals that allow anyone to access any amount of computing power (from desktop computers, clusters, or grids) from anywhere at anytime, of course from any platform including PDAs. We will discuss various approaches to building such a grand challenge systems by surveying the major international adventures in developing this upcoming technology. There are number of social and administrative issues need to be addressed in order to build successful industrial computational power grids. We will share our experience in developing economy driven resource management and scheduling system for the grid that should answer whether such a scalable computing is a hype or reality?

About the Speaker

Rajkumar Buyya is a Research Scholar at the School of Computer Science and Software Engineering, Monash University, Melbourne, Australia. He was awarded Dharma Ratnakara Memorial Trust Gold Medal for his academic excellence during 1992 by Kuvempu/Mysore University. He is co-author of books: *Mastering C++* and *Microprocessor*

x86 Programming; and recently, he has edited a two volume book on *High Performance Cluster Computing*: Architectures and Systems (Vol. 1); Programming and Application (Vol.2) published by Prentice Hall, USA. He served as Guest Editor for the special issues of international journals: Parallel and Distributed Computing Practices, Informatica: An International Journal of Computing and Informatics, and Journal of Supercomputing.

Rajkumar is a speaker in the IEEE Computer Society Chapter Tutorials Program. Along with Mark Baker, he co-chairs the IEEE Computer Society Task Force on Cluster Computing. He has contrbuted to the development of HPCC system software environment for PARAM supercomputer developed by the Centre for Development of Advanced Computing, India.

Rajkumar conducted tutorials on advanced technologies such as Parallel, Distributed and Multithreaded Computing, Client/Server Computing, Internet and Java, Cluster Computing, and Java and High Performance Computing at international conferences including HPC ASIA'97, Seoul, Korea; HiPC'97, Bangalore, India; NCS'98, Pittsburgh, USA; CATE'98, Cancun, Mexico; ASC'98, Cancun, Mexico; AUUG'98, Sydney, Australia; PDCN'98, Brisbane, Australia; and HICSS-32, Hawaii, USA; HiPer'99, Norway; HPC Asia'2000, Beijing, China; ISCA'2000, Vancouver, Canada;, EuroPar'2000, Munich, Germany. He has organised/chaired workshops, symposiums, and conferences at the international level in the areas of Cluster Computing and Grid Computing. He also serves as a reporter for Asian Technology Information Program, Japan/USA. His research papers have appeared in international conferences and journals. His research interests include Programming Paradigms and Operating Environments for Parallel and Distributed Computing.