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**Title: Market-based Grid Computing and the Gridbus Middleware**

Speaker: Rajkumar Buyya, The University of Melbourne, Australia

**Abstract:**

Grid computing, one of the latest buzzwords in the ICT industry, is emerging as a new paradigm for Internet-based parallel and distributing computing. It enables the sharing, selection, and aggregation of geographically distributed autonomous resources, such as computers (PCs, servers, clusters, supercomputers), databases, and scientific instruments, for solving large-scale problems in science, engineering, and commerce. It leverages existing IT infrastructure to optimize compute resources and manage data and computing workloads. The developers of Grids and Grid applications need to address numerous challenges: security, heterogeneity, dynamicity, scalability, reliability, service creation and pricing, resource discovery, resource management, application decomposition and service composition, and quality of services. A number of projects around the world are developing technologies that help address one or more of these challenges. To address some of these challenges, the Gridbus Project at the University of Melbourne has developed grid middleware technologies that (1) enable the creation of Utility Grids, which provide economic incentive for Grid service providers for sharing resources; and (2) support rapid development and optimal deployment of eScience and eBusiness applications on enterprise and global Grids.

**The tutorial covers the following topics:**

1. Fundamental principles of grid computing and emerging technologies that help in creation of Grid infrastructure and applications.
2. A Review of major international efforts in developing Grid software systems and applications both in academic, research and commercial settings.
3. Service-Oriented Grid Architecture for realising utility computing environment that supports resource sharing in research and commercial environments. Realization of this architecture by leveraging standard computing technologies (such as Web Services) and building new services that are essential for constructing industrial-strength Grid engines.
4. Gridbus middleware and technologies for creating enterprise and global utility Grids.
5. Issues in setting up Grids that can scale from enterprise to global and deploying applications on them.
6. Case studies on the use of Gridbus technologies in creating applications in the area of Drug Discovery, Neuroscience, High Energy Physics, Kidney Modelling, and Investment Risk Analysis.
7. Live demonstration of Gridbus technologies and their use in creating and deploying sample applications on the World Wide Grid (WWG).
8. Sociological and industrial implications of this new Internet-based distributed computing paradigm and its impact on the marketplace.

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**About the Speaker:**

Dr. Rajkumar Buyya is an Associate Professor and Reader of Computer Science and Software Engineering; and Director of the Grid Computing and Distributed Systems (GRIDS) Laboratory at the University of Melbourne, Australia. He was awarded Dharma Ratnakara Memorial Trust Gold Medal in 1992 for his academic excellence at the University of Mysore, India. He received Richard Merwin Award from the IEEE Computer Society (USA) for excellence in academic achievement and professional efforts in 1999. He received Leadership and Service Excellence Awards from the IEEE/ACM International Conference on High Performance Computing in 2000 and 2003. He has authored/co-authored over 200 publications. He received "Research Excellence Award" from the University of Melbourne for productive and quality research in computer science and software engineering in 2005. The Journal of Information and Software Technology in Jan 2007 issue, based on an analysis of ISI citations, ranked Dr. Buyya's paper (published in the Software: Practice and Experience Journal in 2002) as one among the "Top 20 cited Software Engineering Articles in 1986-2005".

Dr. Buyya is serving as an Associate Editor of the Future Generation Computer Systems Journal, Elsevier Press, The Netherlands. He is also serving as the Chair of the IEEE Technical Committee on Scalable Computing (TCSC). He has co-founded and chaired four IEEE/ACM international conferences: CCGrid, Cluster, Grid, and E-Science. He has presented over 140 invited talks (keynotes, tutorials, and seminars) on his vision on IT Futures and advanced computing technologies in several international conferences and institutions in Asia, Australia, Europe, North America, and South America. For further information on Dr. Buyya, please browse: <http://www.buyya.com>