Title: Cloud Computing: The Next Revolution in Information Technology

Speaker:
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Abstract:
Computing is being transformed to a model consisting of services that are commoditised and delivered in a manner similar to utilities such as water, electricity, gas, and telephony. In such a model, users access services based on their requirements without regard to where the services are hosted. Several computing paradigms have promised to deliver this utility computing vision and they include Grid computing, P2P computing, and more recently Cloud computing. The latter term denotes the infrastructure as a Cloud in which businesses and users are able to access applications from anywhere in the world on demand. Cloud computing delivers infrastructure, platform, and software (application) as services, which are made available as subscription-based services in a pay-as-you-go model to consumers. These services in industry are respectively referred to as Infrastructure as a Service (Iaas), Platform as a Service (PaaS), and Software as a Service (SaaS). To realize Cloud computing potential, vendors such as Amazon, Google, Microsoft, and IBM are starting to create and deploy Clouds in various locations around the world. In addition, companies with global operations require faster response time, and thus save time by distributing workload requests to multiple Clouds in various locations at the same time. This creates the need for establishing a computing atmosphere for dynamically interconnecting and provisioning Clouds from multiple domains within and across enterprises. There are many challenges involved in creating such Clouds and Cloud interconnections.

This keynote (1) presents the 21st century vision of computing and identifies various IT paradigms promising to deliver the vision of computing utilities; (2) defines the architecture for creating market-oriented Clouds and computing atmosphere by leveraging technologies such as VMs; (3) provides thoughts on market-based resource management strategies that encompass both customer-driven service management and computational risk management to sustain SLA-oriented resource allocation; (4) presents the work carried out as part of our new Cloud Computing initiative, called Cloudbus: (i) Aneka, a software system for providing PaaS within private or public Clouds and supporting market-oriented resource management, (ii) internetworking of Clouds for dynamic creation of federated computing environments for scaling of elastic applications, (iii) creation of 3rd party Cloud brokering services for content delivery network and e-Science applications and their deployment on capabilities of IaaS providers such as Amazon and Nirvanix along with Grid mashups, and (iv) CloudSim supporting modelling and simulation of Clouds for performance studies; and (v) concludes with the need for

convergence of competing IT paradigms for delivering our 21st century vision along with pathways for future research.

About the speaker:

Rajkumar Buyya is Professor of Computer Science and Software Engineering; and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. He is also serving as the founding CEO of Manjrasoft Pty Ltd., a spin-off company of the University, commercialising its innovations in Grid and Cloud Computing. He has authored and published over 300 research papers and four text books. The books on emerging topics that Dr. Buyya edited include, High Performance Cluster Computing (Prentice Hall, USA, 1999), Content Delivery Networks (Springer, Germany, 2008), Market-Oriented Grid and Utility Computing (Wiley, USA, 2009), and Cloud Computing: Principles and Paradigms (Wiley, 2010). He is one of the highly cited authors in computer science and software engineering worldwide (h-index=48, g-index=102, 12000+ citations).

Dr. Buyya has contributed to the creation of high-performance computing and communication system software for Indian PARAM supercomputers. He has pioneered Economic Paradigm for Service-Oriented Distributed Computing and developed key Grid and Cloud Computing technologies such as Gridbus and Aneka that power the emerging e-Science and e-Business applications. Software technologies for Grid and Cloud computing developed under Dr. Buyya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 40 countries around the world.

Dr. Buyya has led the establishment and development of key community activities, including serving as foundation Chair of the IEEE Technical Committee on Scalable Computing and four IEEE conferences (CCGrid, Cluster, Grid, and e-Science). He has presented over 200 invited talks on his vision on IT Futures and advanced computing technologies at international conferences and institutions in Asia, Australia, Europe, North America, and South America. These contributions and international research leadership of Dr. Buyya are recognised through the award of "2009 IEEE Medal for Excellence in Scalable Computing" from the IEEE Computer Society, USA. For further information on Dr. Buyya, please visit his cyberhome: www.buyya.com.