

KEYNOTE/PLENARY

Title:

Neoteric Frontiers in Cloud and Quantum Computing

Speaker:

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ABSTRACT

The twenty-first-century digital infrastructure and applications are driven by Cloud computing and Internet of Things (IoT) paradigms. The Cloud computing paradigm has been transforming computing into the 5th utility wherein "computing utilities" are commoditized and delivered to consumers like traditional utilities such as water, electricity, gas, and telephony. It offers infrastructure, platform, and software as services, which are made available to consumers as subscription-oriented services on a pay-as-you-go basis over the Internet. Its use is growing exponentially with the continued development of new classes of applications such as AI-powered models (e.g., ChatGPT) and the mining of crypto currencies such as Bitcoins. To make Clouds pervasive, Cloud application platforms need to offer (1) APIs and tools for rapid creation of scalable and elastic applications and (2) a runtime system for deployment of applications on geographically distributed Data Centre infrastructures (with Quantum computing nodes) in a seamless manner.

The Internet of Things (IoT) paradigm enables seamless integration of cyber-and-physical worlds and opening opportunities for creating new classes of realtime applications such as smart cities, smart robotics, and smart healthcare. The emerging Fog/Edge computing models support latency sensitive/real-time IoT applications with a seamless integration of network-wide resources all the way from edge to the Cloud.

This keynote presentation will cover (a) 21st century vision of computing and identifies various emerging IT paradigms that make it easy to realize the vision of computing utilities; (b) innovative architecture for creating elastic Clouds integrating edge resources and managed Clouds, (c) Aneka 6G, a 6th generation Cloud Application Platform, for rapid development of Big Data/AI applications and their deployment on private/public Clouds driven by user requirements, (d) a novel FogBus software framework with Blockchain-based data-integrity management for end-to-end IoT-Fog/Edge-Cloud integration for execution of realtime IoT applications, (e) experimental results on deploying Big Data/IoT applications in engineering, health care (e.g., COVID-19), deep learning/Artificial intelligence (AI), satellite image processing, and natural language processing (mining COVID-19 literature for new insights) on elastic Clouds, (f) QFaaS: A Serverless Function-as-a-Service Framework for Quantum Computing, and (g) new directions for emerging research in Cloud, Edge, and Quantum computing.

SPEAKER BIOGRAPHY AND PHOTO



Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor 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, a spin-off company of the University, commercializing its innovations in Cloud Computing. He has authored over 850 publications and seven textbooks including "Mastering Cloud Computing" published by McGraw Hill, China Machine Press, and Morgan Kaufmann for Indian, Chinese and international markets respectively. Dr. Buyya is one of the highly cited authors in computer science and software engineering worldwide (h-index=169 g-index=373, and 152,700+ citations). He graduated 60 PhD students who are working in world-leading research universities and high-tech companies such as Microsoft, Google, and IBM. He has been recognised as IEEE Fellow, a "Web of Science Highly Cited Researcher" for seven times since 2016, the "Best of the World" twice for research fields (in Computing Systems in 2019 and Software Systems in 2021/2022/2023) as well as "Lifetime Achiever" and "Superstar of Research" in "Engineering and Computer Science" discipline twice (2019 and 2021) by the Australian Research Review.

Software technologies for Grid, Cloud, and Fog computing developed under Dr. Buyya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 50+ countries around the world. Manjrasoft's Aneka Cloud technology developed under his leadership has received "Frost New Product Innovation Award". He served as founding Editor-in-Chief of the IEEE Transactions on Cloud Computing. He is currently serving as Editor-in-Chief of Software: Practice and Experience, a long-standing journal in the field established 54+ years ago. He has presented over 750 invited talks (keynotes, tutorials, and seminars) on his vision on IT Futures, Advanced Computing technologies, and Spiritual Science at international conferences and institutions in Asia, Australia, Europe, North America, and South America. He has recently been recognized as a Fellow of the Academy of Europe. For further information on Dr. Buyya, please visit his cyberhome: www.buyya.com