Market-Oriented Cloud Computing: Opportunities and Challenges

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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. Cloud computing is the most recent emerging paradigm promising to turn the vision of "computing utilities" into a reality. Cloud computing has emerged as one of the buzzwords in the IT industry. Several IT vendors are promising to offer storage, computation and application hosting services, and provide coverage in several continents, offering Service-Level Agreements (SLA) backed performance and uptime promises for their services. It 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. The price that Cloud Service Providers charge can vary with time and the quality of service (QoS) expectations of consumers.

This keynote talk will cover (a) 21st century vision of computing and identifies various IT paradigms promising to deliver the vision of computing utilities; (b) the architecture for creating market-oriented Clouds by leveraging technologies such as VMs; (c) market-based resource management strategies that encompass both customer-driven service management and computational risk management to sustain SLA-oriented resource allocation; (d) Aneka, a software system for rapid development of Cloud applications and their deployment on private/public Clouds with resource provisioning driven by SLAs and user QoS requirements, (e) experimental results on deploying Cloud applications in engineering, gaming, and health care domains (integrating sensors networks, mobile devices), ISRO satellite image processing on elastic Clouds, and (f) need for convergence of competing IT paradigms for delivering our 21st century vision along with pathways for future research.