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Modeling and Simulation Frameworks for Cloud Computing Environment: A Critical Evaluation

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Abstract : The recent surge in the adoption of cloud computing systems by various organizations has brought forth the challenge of evaluating their performance. One of the major issues faced by the cloud service providers and customers is to assess the ability of cloud computing systems to provide the desired services in accordance to the QoS and SLA constraints. To this end, an opportunity exists to develop means to ensure that the desired performance levels of such systems are met under simulated environments. This will eventually minimize the service disruptions and performance degradation issues during the commissioning and operational phase of cloud computing infrastructure. However, it is observed that several simulators and modelers are available for simulating the cloud computing systems. Therefore, this paper presents a critical evaluation of the state-of-the-art modeling and simulation frameworks applicable to cloud computing systems. It compares the prominent simulation frameworks in terms of the API features, programming flexibility, operating system requirements, supported services, licensing needs and popularity. Subsequently, it provides recommendations regarding the choice of the most appropriate framework for researchers, administrators and managers of cloud computing systems.

Keywords : cloud computing, modeling framework, performance evaluation, simulation tools
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