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An Effective Approach for Managing Power Consumption in Cloud Computing Infrastructure

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Highlights

The main aim of this study is to reduce power consumption in the cloud's computing infrastructure and to maximize resource utilization and reduce the number of VM migrations. The research objectives of this paper are as follow:

- To design an energy-aware allocation mechanism that can minimize the overall energy consumption, reduce active PMs and avoid task failure.
- To design a scheduling technique that can assist in maximizing resource utilization and minimizing the number of VM migrations.
- To evaluate the proposed mechanism in comparison to the other recent energy management mechanisms in terms of energy consumption, resource utilization, and the number of VM migrations.

Abstract—Cloud computing offers a dynamic provisioning of server capabilities as a scalable virtualized service. Big datacenters which deliver cloud computing services consume a lot of power. This results in high operational cost and large carbon emission. One way to lower power consumption without affecting the cloud services quality is to consolidate resources for reducing power. In this paper, we introduce a DNA-based Fuzzy Genetic Algorithm (DFGA) that employs DNA-based scheduling strategies to reduce power consumption in cloud datacenters. It is a power-aware architecture for managing power consumption in the cloud computing infrastructure. We also identify the performances metrics that are needed to evaluate the proposed work performance. The experimental results show that DFGA reduced power consumption when comparing with other algorithms. Our proposed work deals with real time task which is not static, and concentrates on the dynamic users since they are involved in cloud.