The optimization of resources allocation to minimize energy consumption within data center in cloud

ABSTRACT

Cloud computing is a ubiquitous technology in computer science which provides some advantages to current users of modern computing. The advantages of these services are extremely significant, but the data centers that offer this kind of service are suffering from over power consumption that impose serious threats to the environment due to the emission of carbon dioxide to the atmosphere.Because of some disadvantages in Dynamic Voltage Frequency Scheduling (DVFS), this paper proposes a cloud scheduling algorithm adapted from Dynamic Resource Allocation Method (DRA) to be developed with the goal of dynamically virtual machines (VMs) migration when resource utilization reaches above or below threshold readings in order to optimize the power consumption towards energy saving in cloud data center. The advantage of having VMs migration mechanism is to have the capability to consolidate VMs in order to optimize the capacity of resources utilization. Thus, at the same time it has the capability to switch off some under-loaded hosts which are below the threshold reading. So in this research, our proposed algorithm is going to optimize the total running machine by switching off the hosts with below 30% of CPU power consumption and migrate all the VMs run under it to other hosts.But, for over-utilized hosts with more than 90% of computing resources consumption, the migration of some VMs run under it will be carried out. When comparing with DVFS in a set of experiment, the proposed algorithm is better in terms of lower power consumption.

Keyword: Cloud; DRA; DVFS; Virtual machines; Power consumption; VM migration