

The Effect of Cloud Workload Consolidation on Cloud Energy Consumption and Performance in Multi-Tenant Cloud Infrastructure

Kenga Mosoti Derdus¹, Vincent Oteke Omwenga¹ and Patrick Job Ogao^{2*}.

¹Strathmore University

^{2*}Department of Geo-Science and Environment Technical University of Kenya

Abstract

As energy consumption is becoming a problem in cloud data centers, cloud service providers have adopted different techniques to address this problem. One of the most attractive technique is virtual machine (VM) consolidation. Apart from reducing energy consumption in computing platforms, this technique has other advantages such as reduced infrastructure costs and ease of virtual machine management. However, VM consolidation, which does not recognize workload characteristics may, in the long run, increase energy consumption and lead energy wastage. This paper investigates the relationship between different VM workload types and server energy consumption in a multi-tenant data centers. Experiments are conducted using well known CPU, I/O, memory and network intensive workload benchmark obtained from Phoronix Test Suite (PTS). Results obtained show that there is a noticeable difference in the amount of energy consumed when VMs run workloads, which dominate the various server physical resources. Secondly, consolidating homogeneous workloads is disastrous in terms of energy consumption and performance over heterogeneous workloads. The latter can further reduce energy consumption and achieve acceptable performance levels if an optimum workload mix is reached.

International Journal of Computer Applications Vol.181 (37) pp.47-53 (2019).

See more at: <https://www.ijcaonline.org/archives/volume181/number37/derdus-2019-ijca-918353.pdf>