ENERGY EFFICIENT VM CONSOLIDATION IN BIG DATA COMPUTING ENVIRONMENTS

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ABSTRACT

Virtual Machine Consolidation (VMC) facilitates the optimal resource utilisation, energy conservation and quality of service. VMC is a technique which is performed to maintain a minimal number of active hosts by migrating and consolidating the Virtual Machines (VM) into a reduced number of physical machines to conserve energy. It includes VM placement and VM migration. Evolutionary algorithms are used to solve dynamic population based problems. In this paper, we evaluate the performance of Genetic Algorithm and Power Aware Best Fit Decreasing (PABFD) Algorithm to find the VM consolidation under energy consumption, SLA violation, number of host shutdowns and number of VM migrations metrics. The evolutionary algorithm, Genetic Algorithm (GA) is used to encompass under load and over load utilisation detections, VM selection and VM placement. Median Absolute Deviation (MAD), Interquartile Range (IQR), Local Regression (LR), Robust Local Regression (LRR) and Static CPU Utilisation Threshold (THR) schemes estimate the dynamic CPU utilisation threshold for overload host detection. Minimum Migration Time (MMT), Random Selection (RS), Maximum Correlation (MC) work as VM selection policies. The combination of overload host detection and VM selection policies in GA and PABFD provides Planetlab cloud data based simulation results. The simulation results illustrate MAD results in minimal energy consumption while GA resulted in maximum energy consumption.

Key Words: Energy Consumption, SLAV, VMC, VM Migration, GA, PABFD