Abstract

Sherif Fahmy

More Accurate Estimation of Working Set Size in Virtual Machines

Accurate working set size estimation is important to increase the consolidation ratio of data centers and to improve the efficiency of live migration. Thus, it is important to come up with a technique that provides an accurate estimation of the working set size of virtual machines that can respond to changes in memory usage in real-time. In this paper, we study the problem of working set size estimation in virtual machines and come up with a method that allows us to better estimate the working set size of virtual machines in Linux. Toward that end, we design a finite state machine that can be used to accurately estimate the working set size and that is responsive to changes in workload. We then implement the algorithm on Linux using QEMU-KVM as our hypervisor. The system is tested using the sysbench benchmark for memory, CPU, and database workloads. The results indicate that our algorithm provides better results in terms of average working set size estimations and is competitive with existing techniques in terms of page faults.