Project Status Report: Advanced Operating System
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Deciding on the virtual machine performance benching marking is one of the most crucial points in our project, hence as part of our research survey we studied a couple of papers that talked about the benchmarking for the virtual machine performance. Both the papers are concerned about using a new benchmarking methodology of their own domain. One paper talks about medical image processing case and other about the cloud computing environment.

The first paper analyzes the performance of virtualization by measuring the performance by benchmarking certain metrics of their own and discuss their findings. In their field the effect of high performance is of much importance as speed could be impacted when the execution needs to pass through the multiple layers of device drivers before reaching the disk or the network interface. Here they measure the metrics like memory utilization, local disk and network disk bandwidth utilization, network web interface bandwidth over HTTP and the performance of the integer and floating point operations on a combination of VM environment and the host machine operating system.

The things that we could borrow from this project to measure performance metrics can be the standard Linux command "dd" to measure the file I/O performance. For integer and floating point operations we might consider Dhrystone-2 and Whetstone respectively as the benchmark . This selection seems apparent due to their free availability as against the current day benchmarks that incur cost.

The second paper talks about evaluating the performance of the virtual machines by the introduction of a benchmarking suite called the Virt-B, this suite measures several virtualization scenarios and concludes as to how this is better than the currently existing benchmarking methods. They also introduce a testing toolkit to automate the measurement of the performance. This work is performed on a cloud environment and they have briefly talked about the three layered benchmarking methodology.

As hypervisor software helps share resources among VMs, it also incurs overhead acting as an intermediate layer between the hardware and the VMs. The paper discusses how the older benchmarking methods do not account for this resource allocation. They also have touched upon overhead due to live migration and the virtual clusters. The methodology measures performance through hardware, VMM and VM layer and they present various virtualization scenarios and test the performance of each case using their automated testing toolkit. Since this is purely a cloud environment assessment, we might still consider adopting some of their measurement techniques to our non cloud environment for now.