

**Enhancing Performance and Energy Efficiency for Hybrid Workloads in Virtualized Cloud Environment**

**Abstract:**

Virtualization has attained mainstream status in enterprise IT industry. Despite its widespread adoption, it is known that virtualization also introduces non-trivial overhead when executing tasks on a virtual machine (VM). In particular, a combined effect from device virtualization overhead and CPU scheduling latency can cause performance degradation when computation intensive tasks and I/O intensive tasks are co-located on a VM. Such an interference causes extra energy consumption, as well. In this paper, we present Hylics, a novel solution that enables efficient data traverse paths for both I/O and computation intensive workloads. This is achieved with the provision of in-memory file system and network service at the hypervisor level. Several important design issues are pinpointed and addressed during our prototype implementation, including efficient intermediate data sharing, network service offloading, and QoS-aware memory usage management. Based on our real-world deployment on KVM, Hylics can significantly improve computation and I/O performance for hybrid workloads. Moreover, this design also alleviates the existing virtualization overhead and naturally optimizes the overall energy efficiency.