

**CHENNAI – PONDICHERRY**

**Scatter-Gather Live Migration of Virtual Machines**

**Abstract:**

We introduce a new metric for live migration of virtual machines (VM) called eviction time defined as the time to evict the state of one or more VMs from the source host. Eviction time determines how quickly the source can be taken offline or its resources repurposed for other VMs. In traditional live migration, such as pre-copy and post-copy, eviction time equals the total migration time because the source is tied up until the destination receives the entire VM. We present Scatter-Gather live migration which decouples the source and destination during migration to reduce eviction time when the destination is slow. The source scatters the memory of VMs to multiple nodes, including the destination and one or more intermediaries. Concurrently, the destination gathers the VMs’ memory from the intermediaries and the source. Thus eviction from the source is no longer bottlenecked by the reception speed of the destination. We support simultaneous live eviction of multiple VMs, and exploit deduplication to reduce network overhead. Our Scatter-Gather implementation in the KVM/QEMU platform reduces the eviction time by up to a factor of 6 against traditional pre-copy and post-copy while maintaining comparable total migration time when the destination is slower than the source.

**Existing System:**

In traditional live VM migration techniques the eviction time is equal to the total migration time, which is defined as the interval from the start of migration at the source to the time when the entire VM state has been transferred to the destination and the VM resumes execution. When the source host directly transfers the VM’s state to the destination host (typically over a TCP connection), a VM cannot be migrated faster than the slower of the two endpoints. The source is coupled to the destination for the entire duration of VM migration and cannot be quickly deprovisioned.

**Proposed System:**

We present a new approach to rapidly evict one or more VMs from the source when the destination is slow in receiving the VMs. The key idea is to temporally decouple the source and the destination hosts during migration. In other words, the source should quickly unload the state of migrating VMs, preferably at its maximum transmission rate, whereas the destination should retrieve and resume the VMs at its own pace, as local resources become available.

We develop **a variant of post-copy migration** in Scatter-Gather, wherein the VM’s CPU state is first resumed at the destination while its memory is still scattered across the intermediaries and the source. The VM’s memory pages are gathered from intermediaries through a combination of active prepaging and demand paging. Using a post-copy variant, as opposed to pre-copy allows the VM to resume at the destination even as its memory is fetched from intermediaries.