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Flexible scheme of space management in ZNS SSD and/or SMR HDD storage pool for massive set of Virtual Machines (VMs)

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Multiple Virtual Machines (VMs) workload is a widely deployed use-case. Let's imagine a storage pool that can include multiple ZNS SSDs, SMR HDDs or a mixture of different types of storage devices (and, maybe, some computational power in the storage pool). The crucial question here is how to implement and deliver a flexible and efficient scheme of storage pool's space distribution and management among the pool of VMs. It is possible to imagine a potential scheme that could employ a page table (virtual memory) likewise approach based on multiple user-space virtual block devices (ublk). Additionally, computational power in the storage pool can be used to guarantee reliability of stored data (by means of smart replication or erasure coding scheme, for example), to execute background live migration and load balancing of physical sectors with data (improving performance of operations). This talk is dedicated to discussion how can be implemented the efficient space management scheme of storage pool and which potential drawbacks could be hidden in the suggested approach.

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