AutoReplica: Automatic Data Replica Manager in Distributed Caching and Data Processing Systems
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Introduction and Goal
- Side-effect of replication is mainly the overhead of extra network and I/O traffics, which inevitably downgrades the overall I/O performance of the cluster.
- To effectively balance the trade-off between I/O performance and fault tolerance, in this paper, we propose a complete solution called “AutoReplica” – a replica manager in distributed caching and data processing systems with SSD-HDD tier storages.

System Architecture

Parallel Prefetching

Cache and Recovery Policies

Current Work Progress

- Built in a multi-nodes cluster consists of NVMe SSDs and RAID mode HDDs
- Hosts are connected by high speed fiber cables
- Works on the VMWare’s ESXi in the user mode

- With our customizations, AutoReplica is very close to a pseudo-kernel mode application.
- AutoReplica consists of 4 components: a vSphere web client plug-in, a CIM provider, multiple I/O filter library instances and a daemon process on each VM.