STATEMENT OF RESEARCH INTERESTS

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The advent of NAND flash-based Solid State Drive (SSD), has introduced a new availability in the storage hierarchy. Although most SSDs provide the same interface with traditional hard disk drive, their sophisticated characteristics make it intricate to deploy them in existing systems [1][2]. Moreover, their relatively high price and limited lifespan place a vast decision space where thoughtful insight into storage systems is required, to achieve a both cost- and performance- efficient solution.

My primary research interest is to establish a new storage system exploiting SSD, particularly in distributed computing environments.

Current Research Agenda

Alleviating Checkpoint Bottleneck via Introducing SSD Aggregators

Periodical checkpointing is the most widely adopted solution to provide fault tolerance in High Performance Computing (HPC) clusters. Although the checkpointing becomes crucial as the HPC clusters get larger, it incurs significant extra overhead where computing processors become idle. My current research aims at alleviating the checkpoint overhead by optimally placing SSDs in a HPC cluster. Our work is dissimilar to existing approaches [3][4], suggesting to place SSDs by intuition. We are building a theoretical model, based on in-depth topology analysis of a real HPC cluster, Jaguar [5], which allows us to estimate performance impact of any given placement decision accurately.

Past Research Agendas

Exploiting a NVM Write Buffer in Flash Translation Layer

Future Research Agendas

Deploying SSDs in a Multi-Level Distributed Cache Management System

Filesystem for Diskless Systems

References

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