**Introduction**

Redundant Array of Inexpensive Disks (RAID)
- Higher performance and robustness
- De facto standard for high-performance storage systems

RAID of Solid State Drives (SSDs)
- Even better performance and robustness
- The overall performance of RAID of SSDs is limited by the slowest SSD
- The performance variation of SSDs becomes a major concerns
- SSD can be delayed by unpredictable internal Garbage Collection (GC) process

Contributions of this paper
- A new write cache architecture that considers the performance variation of SSDs

**Background**

Existing write cache for RAID: WOW

**Motivation**

Traditional write cache

SSD 0
SSD 1
SSD 2
SSD 3

A B X Y

(a) Traditional write cache

Proposed write cache

SSD 0
SSD 1
SSD 2
SSD 3

A B X Y

(a) Proposed write cache

**Proposed Write Cache**

Write Request → Write Cache → Destage → Garbage Collection

Independent Write Caches

Stripping & Parity Computation

Destage Write

Synchronization

SSD SSD SSD SSD

SIW

**Experiments**

(a) Average response time

(b) Placement of write caches

(c) Number of synchronized GCs

**Conclusion**

A new write cache design is proposed for an array of SSDs

The proposed write cache, Synchronous Independent Write Cache (SIW) improves the response time by up to 50% and 20% on RAID-0 and RAID-5, respectively, compared with the state-of-the-art write cache algorithm