

Green Multi-Disk Device Mapper

Zhichao Li, Ming Chen, Rajesh Aavuty

Erez Zadok

<http://www.fsl.cs.stonybrook.edu>

Motivation



- Optimize energy *and* performance
- Energy and perf study [SYSTOR'11]
 - ◆ Many factors (CPU Freq, Disk types, etc)
- Dedup system power study [FAST'12]
 - ◆ Large power consumption
 - ◆ Not power proportional

Make storage system green with domain
knowledge aware algorithm

SSD	SAS	SATA
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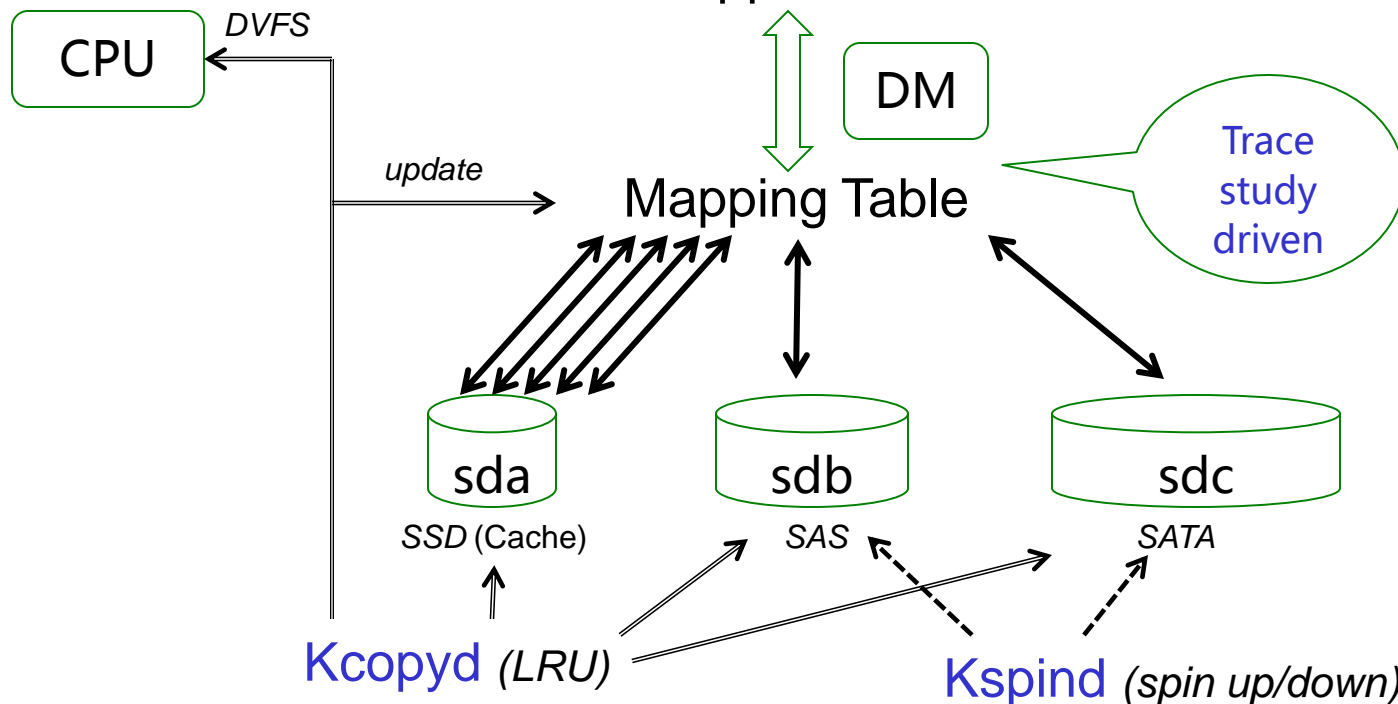
Virtual device

Application IO

User space

Kernel

```
/dev/mapper/<virtual dev>
```



Optimization



- Techniques include but not limited to
 - ◆ Two levels Cache (RAM)
 - ◆ Disk reliability control
 - ◆ Pre-fetch algorithm
 - ◆ Data grouping
 - ◆ IO by-passing algorithm
 - ◆ Overhead control
 - ◆ Periodical metadata flush
 - ◆ etc.