Project 2 Candidates

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Candidates

- DFTL
- KAST
- LAST
- ComboFTL
- CFTL
- Janus-FTL
- ΔFTL
- CAFTL
- LTFTL
C1. DFTL

- **Page-level mapping FTL**
  - Store page mapping table on flash memory
  - Dynamically load/unload mapping table into SRAM

- **Reference**
  - “DFTL: A Flash Translation Layer Employing Demand-Based Selective Caching of Page-Level Address Mappings,” ASPLOS’09
C2. KAST

- K-Associative Log Block Mapping
  - Each log block can be associated to K data blocks at maximum

- Reference
  - “KAST: K-Associative Sector Translation for NAND Flash Memory in Real-Time Systems,” DATE’09
C3. LAST

- Locality-Aware Sector Translation
  - Page-level mapping for random writes
    - Two partitions: Hot / Cold
  - Block-level mapping for sequential writes

- Reference
  - “LAST: Locality-aware Sector Translation for NAND Flash Memory-based Storage Systems,” SPEED’08
C4. ComboFTL

- SLC/MLC region
  - SLC region: Page-level for hot data
  - MLC region: Unit-based page-level for cold data

- Reference
  - “ComboFTL: Improving Performance and Lifespan of MLC Flash Memory using SLC Flash Buffer,” JSA’10
C5. CFTL

- Convertible FTL
  - Change addressing mode
    - Page to block-level mapping: Cold data
    - Block to page-level mapping: Hot data

- Reference
  - “CFTL: A Convertible Flash Translation Layer with Consideration of Data Access Patterns,” SIGMETRICS’10
C6. Janus-FTL

- Provide a spectrum between block and page mapping schemes
  - Block Mapping Area / Page Mapping Area
  - Two operations that move blocks between BMA and PMA
    - Fusion / Defusion

- Reference
C7. ΔFTL

▪ Write compressed delta between the old data and the new data
  • Reduce the number of flash writes

▪ Reference
  • “ΔFTL: Improving SSD Lifetime via Exploiting Content Locality,” EuroSys’12
  • LZF compression algorithm
    http://oldhome.schmorp.de/marc/liblzf.html
C8. CAFTL

- Content-Aware FTL
  - Remove unnecessary duplicate writes
    - Make fingerprint of incoming write
    - Duplicate write if FTL already has the same fingerprint

- Reference
  - “CAFTL: A Content-Aware Flash Translation Layer Enhancing the lifetime of Flash Memory based Solid State Drives,” FAST’11
C9. LTFTL

▪ Lightweight Time-shift FTL
  • Maintain previous pages without reclaiming until a checkpoint
  • Roll-back to a previous consistent storage state
    - Enhance the reliability of flash memory

▪ Reference
  • “LTFTL: Lightweight Time-shift Flash Translation Layer for Flash Memory based Embedded Storage,” EMSOFT’08