

Project 2 Candidates

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Candidates

- DFTL
- KAST
- LAST
- ComboFTL
- CFTL
- Janus-FTL
- Δ FTL
- 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
 - “Janus-FTL: Finding the Optimal Point on the Spectrum Between Page and Block Mapping Schemes,” EMSOFT’10



C7. Δ FTL

- Write compressed delta between the old data and the new data
 - Reduce the number of flash writes
- Reference
 - “ Δ FTL: 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