

1 Flash-Based SSDs

Vocabularies

1. Flash Solid-State Storage

- Is a type of non-volatile computer storage that stores and retrieves digital information using only electronic circuits, without any involvement of moving mechanical parts

2. NAND-Based Flash

- Is an electronic non-volatile computer memory storage medium using NAND-gate that can be electrically erased and reprogrammed.

3. Flash Page

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4. Flash Block

Physical Block Addresses														
Block 0						Block 1						Block n		
Page n	Page 1	Page 0				Page n	Page 1	Page 0				Page n	Page 1	Page 0
Sector 1	Sector 1	Sector 1	Sector 0	Sector n	Sector n	Sector 0	Sector 1	Sector n	Sector 0	Sector 1	Sector n	Sector 0	Sector 1	Sector n

5. Wear Out

- Is similar to going past **expiration date**
- Means it has exceeded their endurance rating

6. Single-Level Cell

7. Multi-Level Cell

8. Triple-Level Cell

9. Banks

10. Planes

11. Pages

12. Head Crash

13. Disturbance
14. Flash Transition Layer
15. Wear Leveling
16. Direct Mapped
17. Logging
18. Logical Block Address
19. Program Disturbance
20. In-Memory Mapping Table
21. Garbage
22. Garbage Collection (GC)
23. Dead Blocks
24. Cache Flush
25. Trim
26. Overprovision
27. Background
28. Page-Level FTL
29. Hybrid Mapping
30. Log Blocks
31. Switch Merge
32. Partial Merge
33. Full Merge

1.1 Storing a Single Bit

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- 1.2 From Bits to Banks / Planes
- 1.3 Basic Flash Operations
- 1.4 From Raw Flash to Flash-Based SSDs
- 1.5 FTL Organization: A Bad Approach
- 1.6 A Log Structured FTL
- 1.7 Garbage Collection
- 1.8 Mapping Table Size
- 1.9 Hybrid Mapping
- 1.10 Wear Leveling
- 1.11 SSD Performance And Cost