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
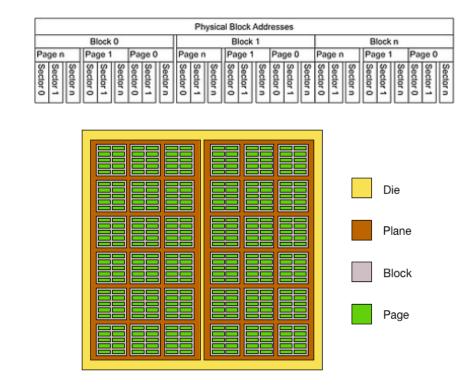
2. **NAND-Based Flash**

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

3. **Flash Page**

   - Is the smallest unit that can be programmed into flash

4. **Flash Block**

   - Is a group of pages and <u>the smallest unit that can be erased</u>.

5. **Wear Out**

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

6. **Single-Level Cell**

- Is a type of cell in solid-state storage that stores one bit of data per transister (0 or 1)

7. **Multi-Level Cell**

- Is a type of cell in solid-state storage that stores two bits of data (i.e 00, 01, 10, 11) per cell using two different levels of charge

8. **Triple-Level Cell**

- Is a type of cell in solid-state storage that stores three bits of data per cell (i.e 000, 001, 010, 011, 100, 101, 110, 111)

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**

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