

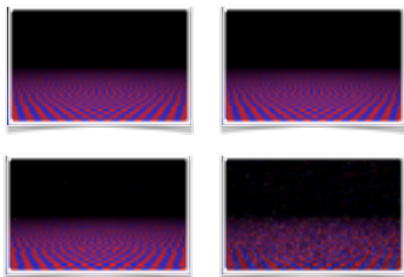
Approximate Storage in Solid-State Memories

Phase-change memory (PCM)

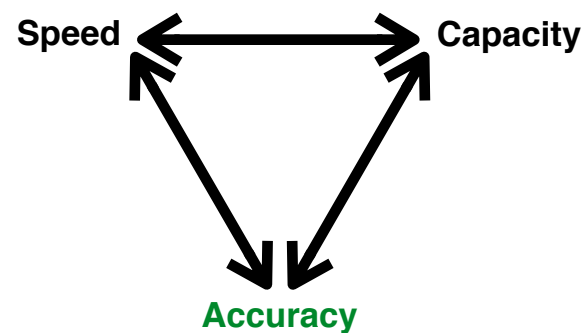
- May scale beyond the limits of DRAM and flash.
- Non-volatile.
- High-density MLC configurations can be slow.
- Cells wear out, limiting device lifetime.

Approximate computing

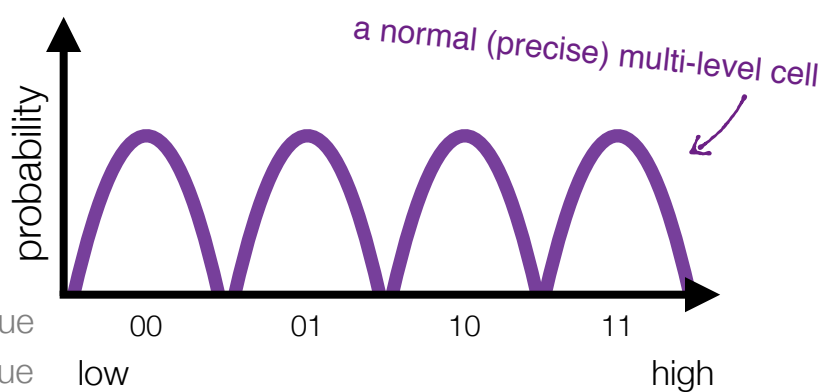
Much of the data in main memory and disk can tolerate occasional errors.



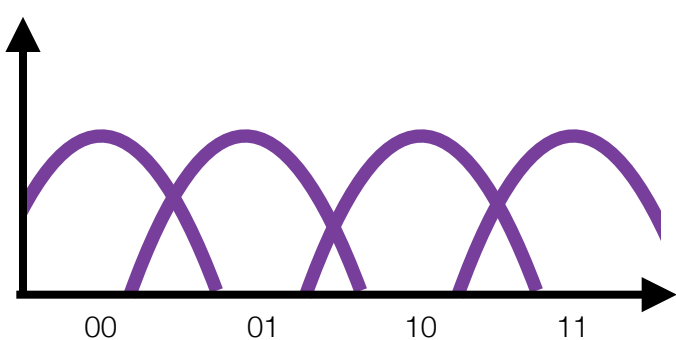
Faster, denser, more durable memories



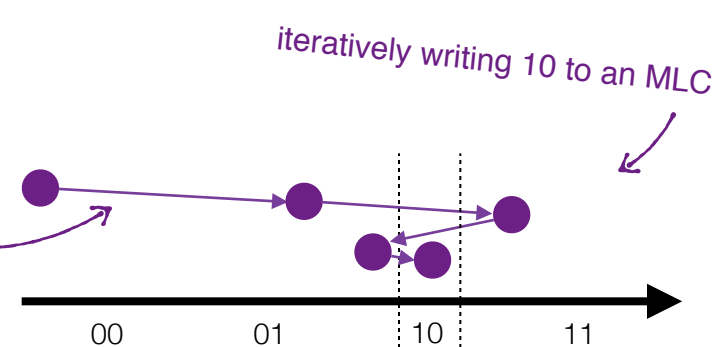
Accelerate writes to multi-level cells.



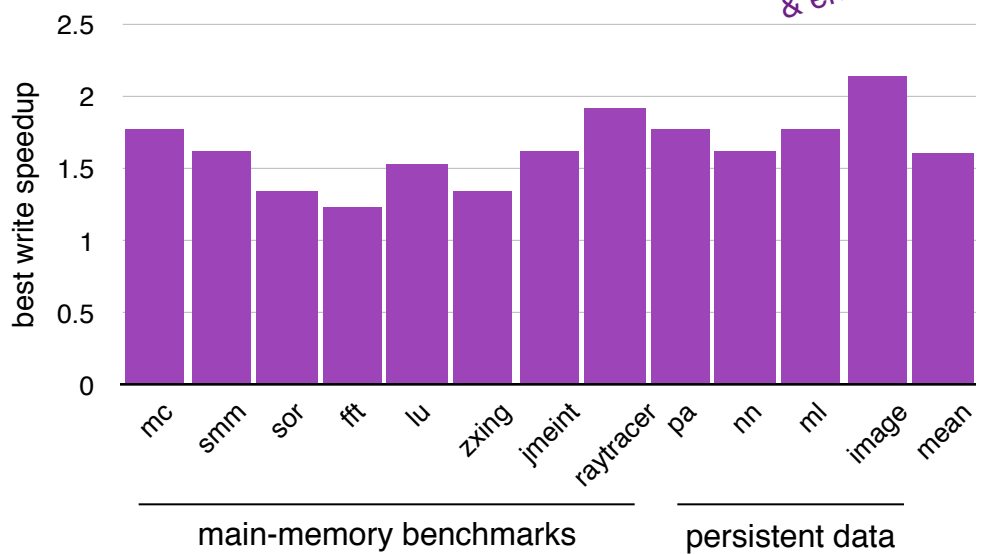
an approximate cell lets the distributions overlap



each write pulse is imprecise, so many iterations are needed

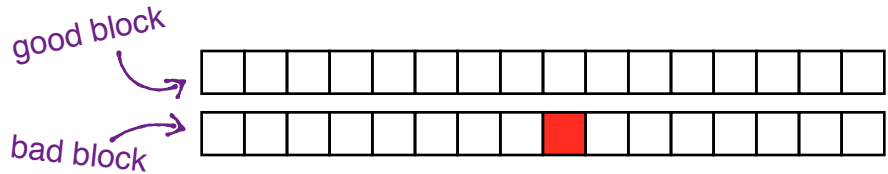


target range: dictates performance & error trade-off

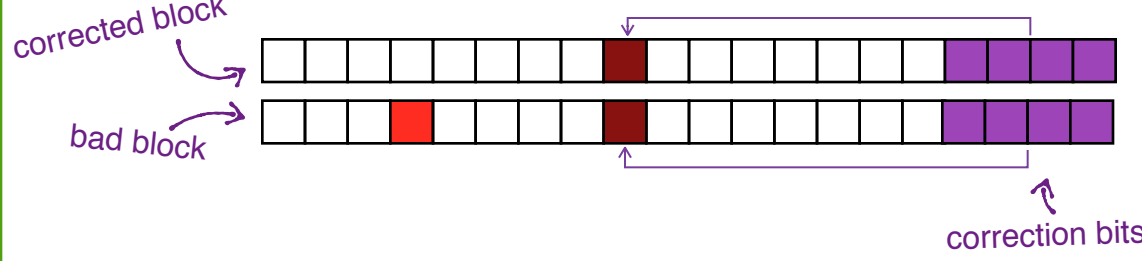


Extend lifetime by reusing failed blocks.

raw PCM: hard failures make a block unusable



error correction extends blocks' useful life



reuse blocks with uncorrectable failures for approximate data

