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Motivation

Background: Relaxing internal retention time of flash memory improves lifetime

Problem: Refreshes typically required to guarantee data integrity, but consume additional writes → potential lifetime improvements restricted

WARM: Write-hotness Aware Retention Mgmt.

• Physically partition pages into two groups using write frequency: write-hot and write-cold
  ▪ Virtual queues for dynamic page reclassification
  ▪ Cooldown window to minimize ping-ponging

• Apply different policies (garbage collection, wear-leveling, refresh) to each group

WARM Results

WARM: Improving NAND Flash Memory Lifetime with Write-hotness Aware Retention Management