Practical Erase Suspension for Modern Low-latency SSDs

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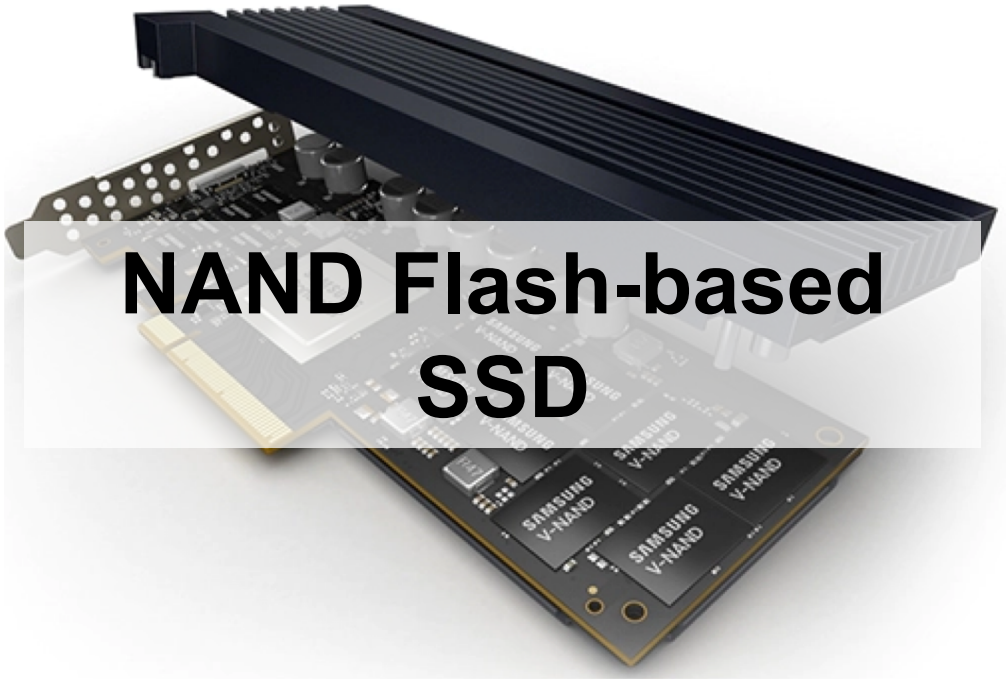
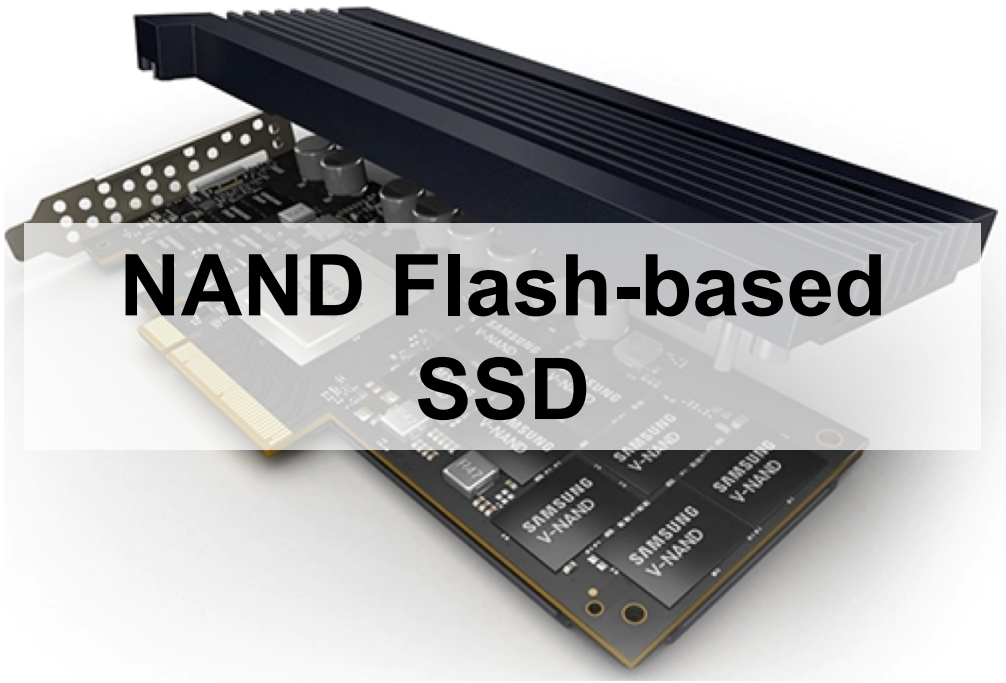
NAND Flash-based SSD



NAND Flash-based SSD

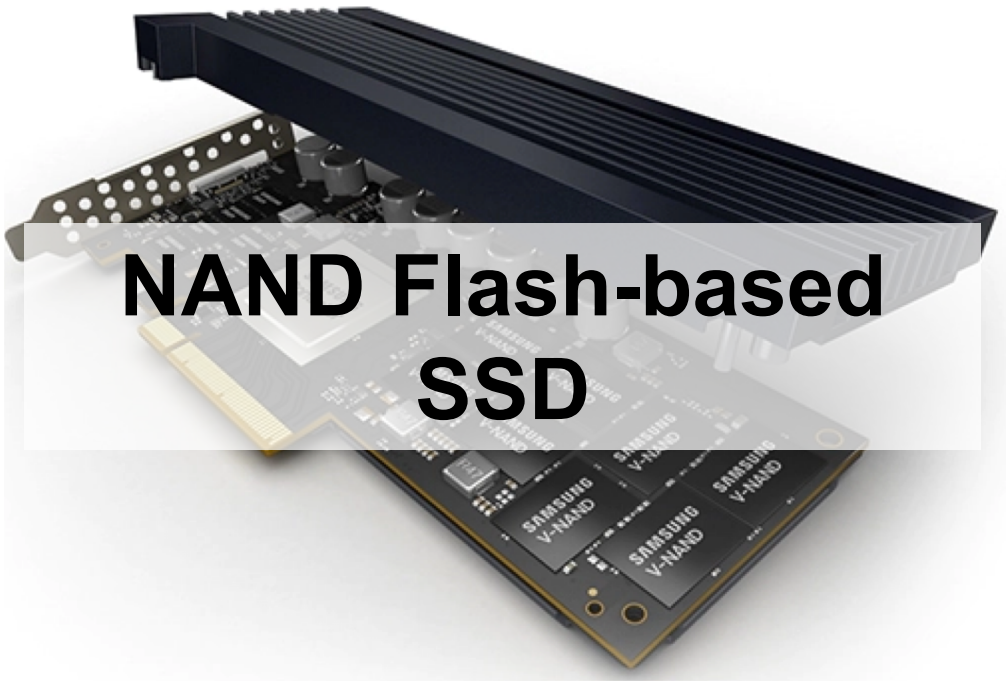


1) Superior Throughput
(e.g., Sequential Read → 6.4GB/s)

2) Low average Latency
(e.g., 4KB Random Read QD1 → 15us)

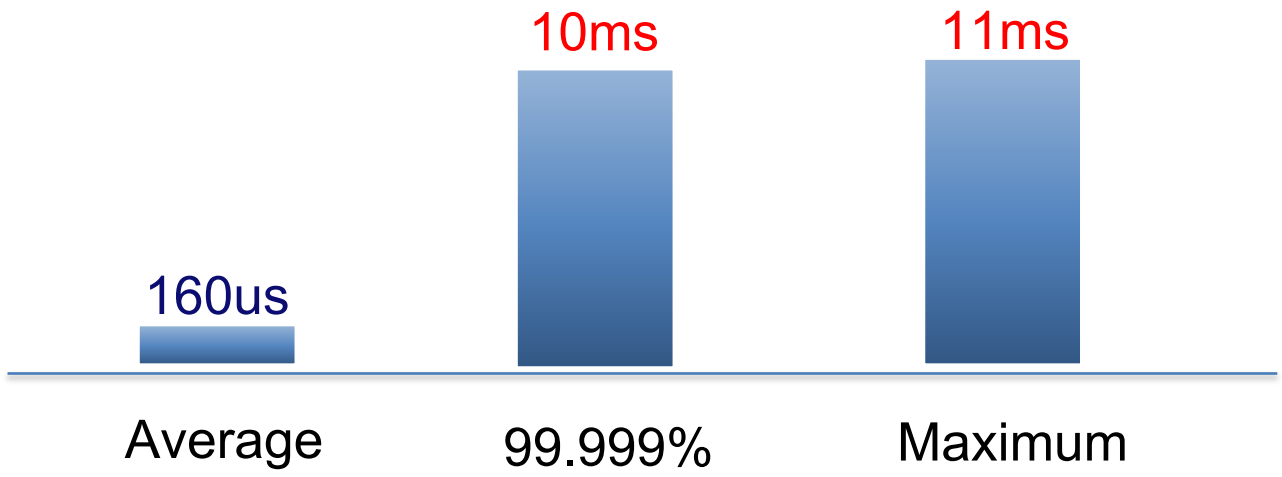
3) Relatively Low Price
(e.g., QLC SSD → 0.1$/GB)

NAND Flash-based SSD



Read Latency

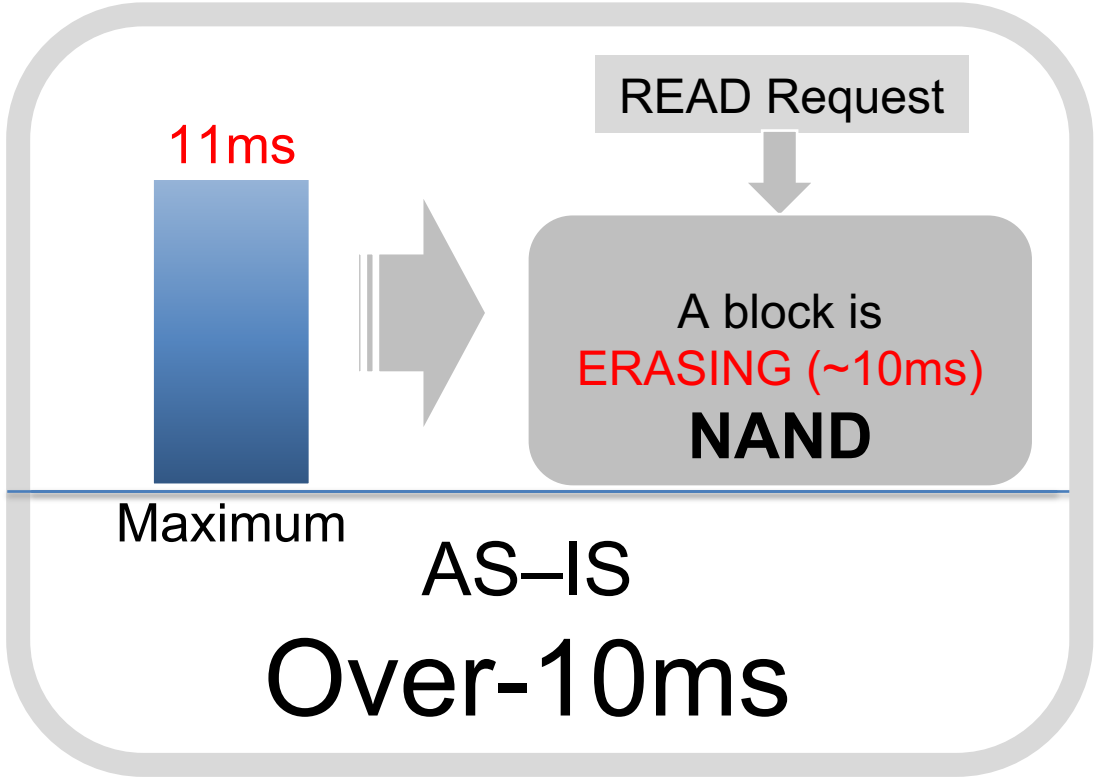
(4KB Random, Read 70%, Write 30%, QD 16)



The source of long read tail latency

Read Tail Latency

(4KB Random, Read 70%, Write 30%, QD 16)



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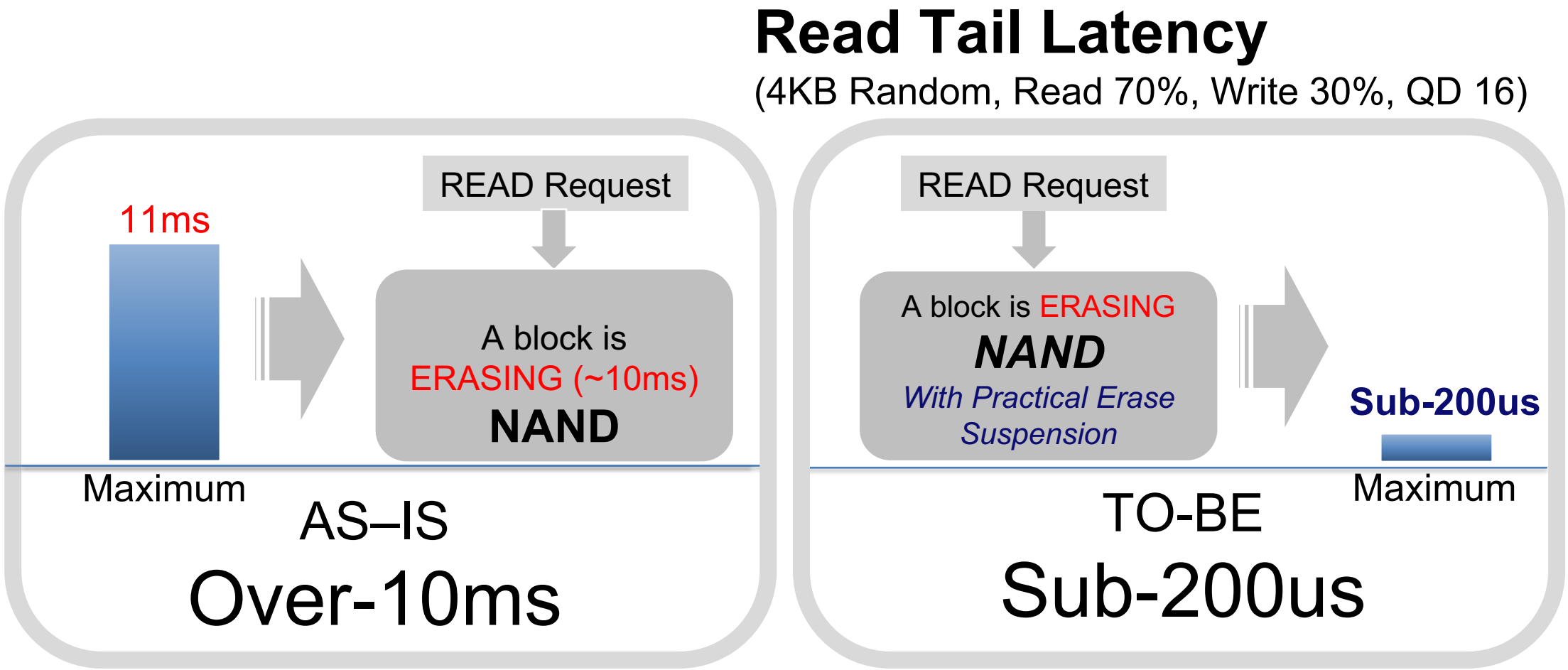

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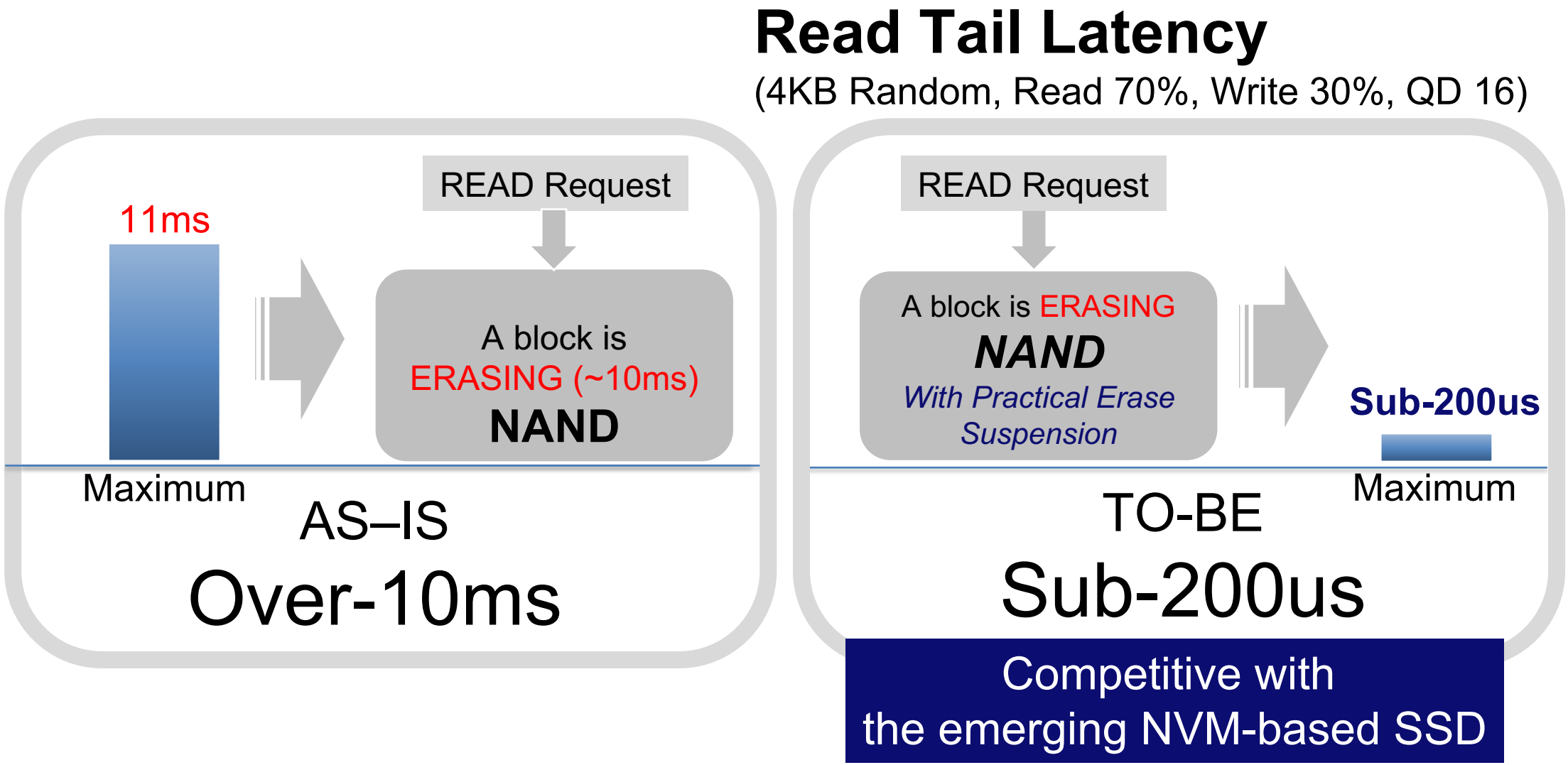
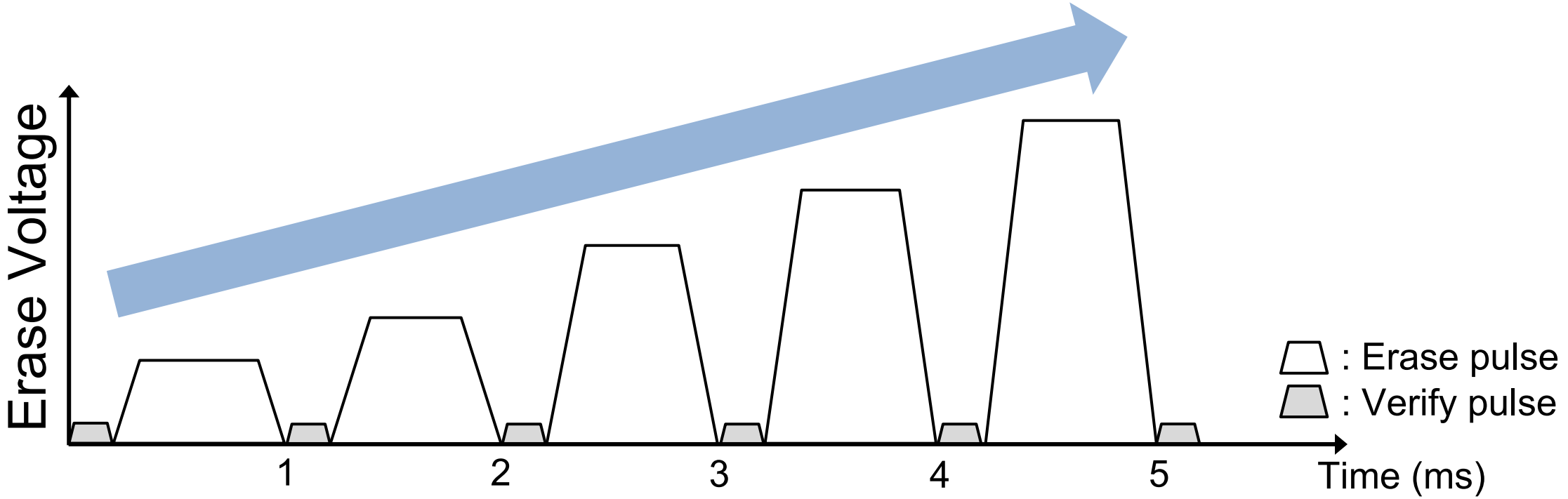
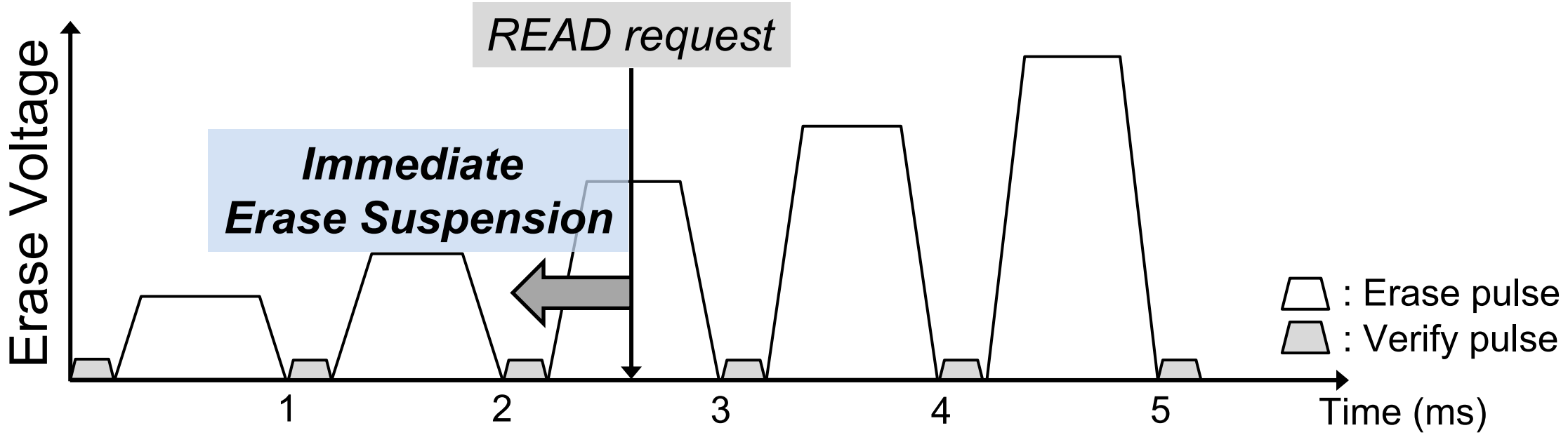


Incremental Step Pulse Erasing (ISPE) scheme



Suspending/Resuming at well-aligned safe points



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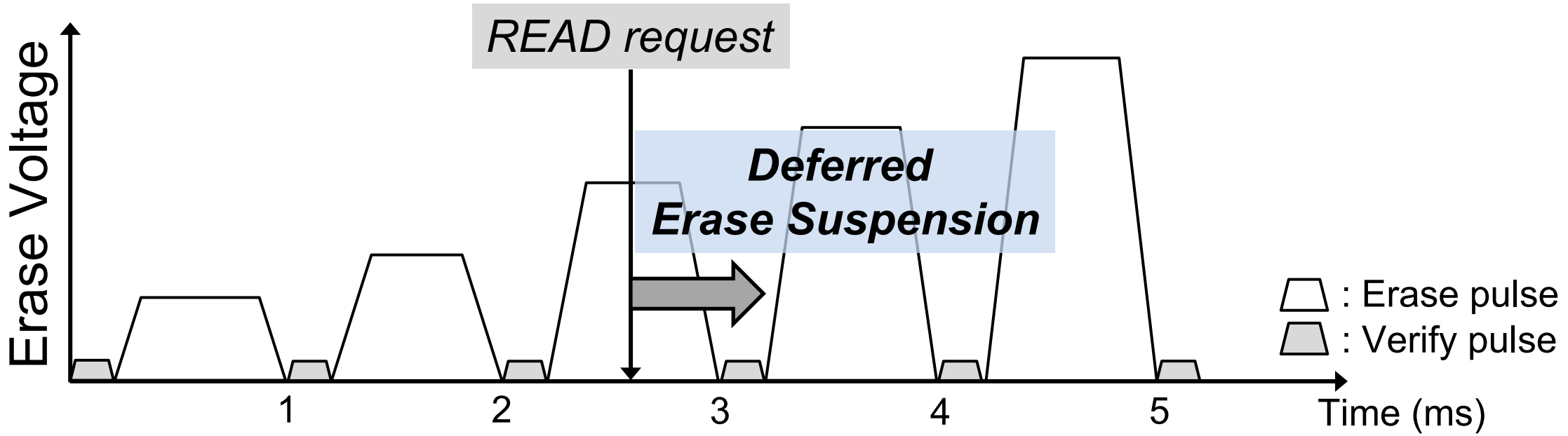

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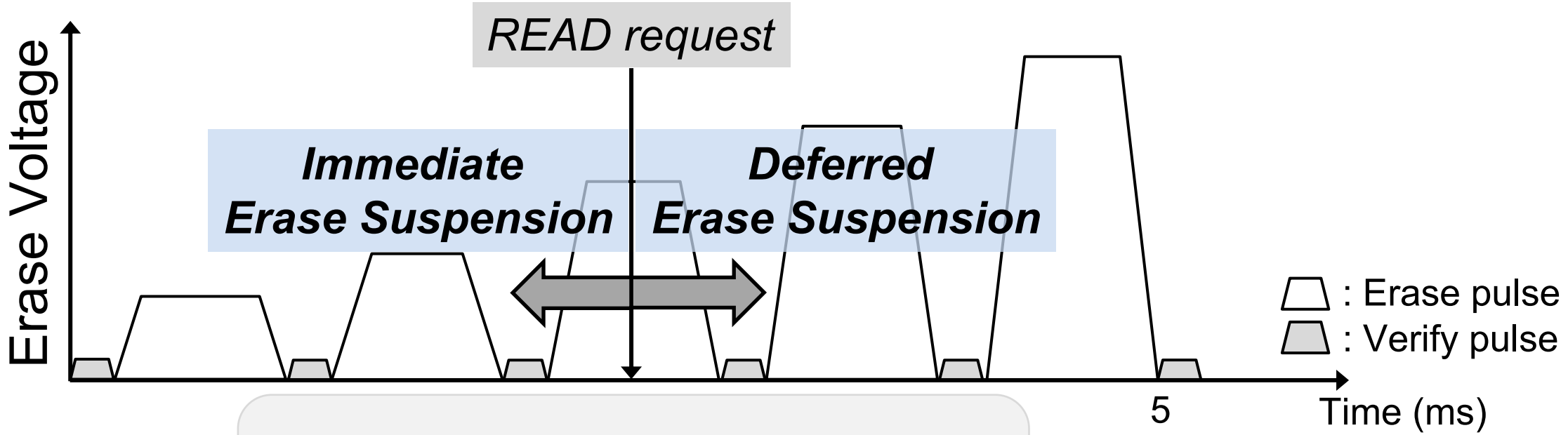

Timeout-based switching mechanism

Summary

- **Practical erase suspension harnesses the full potential of NAND flash-based SSDs**

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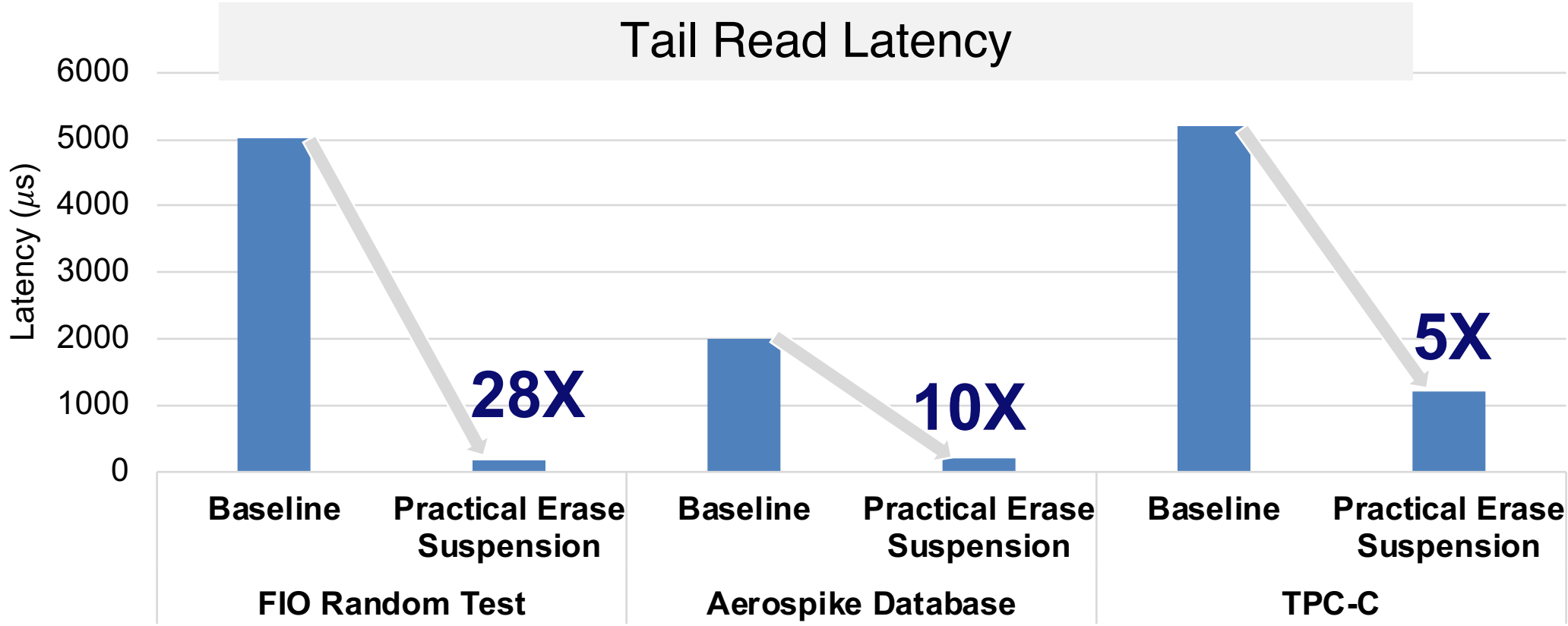

Thank You ☺

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