



### HybriDIMM<sup>™</sup> Media Controller

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## **Memory Solution Space**

- Cost effective 256GB-1TB+ capacities on the DRAM bus
  - Cost effective, High Bandwidth, Low latency
  - Use of Software drivers (no special HW protocol required)
- Architectural context that encompasses
  - Take advantage of large DRAM:NAND price ratio of ~50:1 per GB
  - Supports emerging memory technologies RRAM, PCM, MRAM, NRAM, etc
- Significant progress in standardization
  - Competitive solutions continue to be single sourced



DRAM

## SCM - What is the ideal solution ?

NAND Economics

#### DRAM Performance

Architecture agnostic → using software drivers & accommodating emerging memories

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Cost effective performance improvements and latency reduction

ENCY

LAT

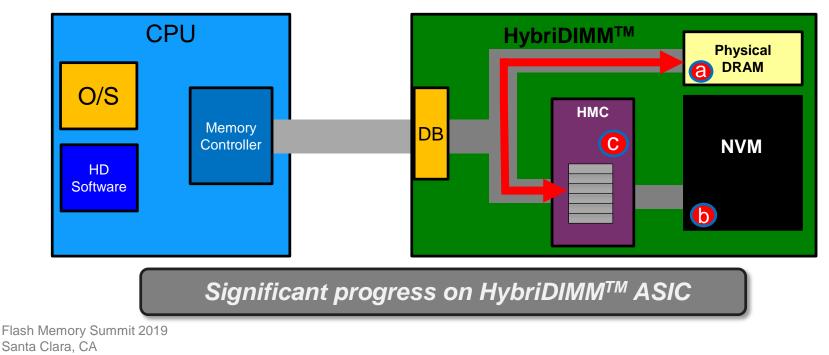
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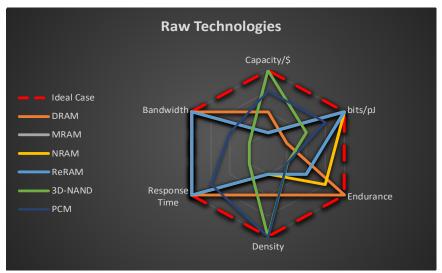
## HybriDIMM<sup>™</sup> solution

- Memory and Storage on one physical DIMM
  - Three HW elements: (a) DRAM, (b) NVM, and (c) HybriDIMM<sup>™</sup> Media Controller (HMC)

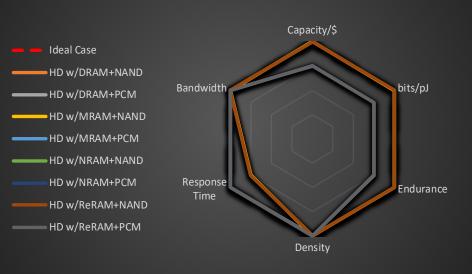




#### SCM: HybriDIMM<sup>™</sup> Architectural Advantages



#### With their own idiosyncrasies & vol. ramps



**HybriDIMM** 

HybriDIMM<sup>™</sup> provides the architectural context to use multiple memory technologies as they mature



# HybriDIMM<sup>™</sup> Momentum Growing

- Summary
  - 1. Cost effective  $\rightarrow$  takes advantage of growing DRAM:NAND price ratio
  - 2. Standardization  $\rightarrow$  not a single sourced solution
  - 3. Software drivers  $\rightarrow$  does not require special HW protocol



Working prototype !!



### Thank You!

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