



Flash Memory Summit

# Impact on Application Development – NVM Programming Model in the Real World

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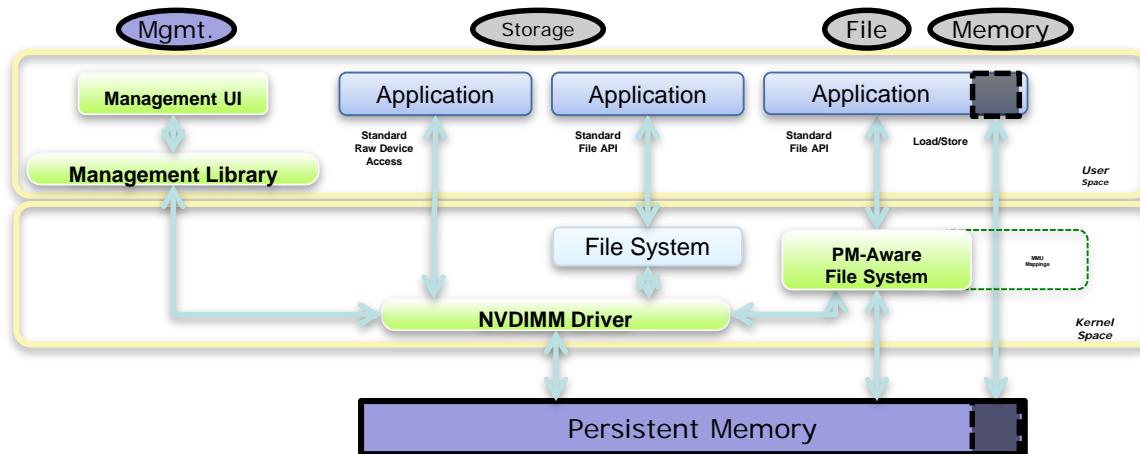
# What Everyone Knows...

- Persistent Memory
  - Allows load/store access like memory
  - Is persistent like storage
  - Exposed to applications using SNIA NVMP
    - Also known as “the persistent memory programming model”
- What Isn't Persistent Memory
  - Something that can only speak blocks (SSD/disk)
  - Something too slow for load/store access
    - “would reasonably stall a CPU waiting for a load to complete”



# Oftentimes Forgotten

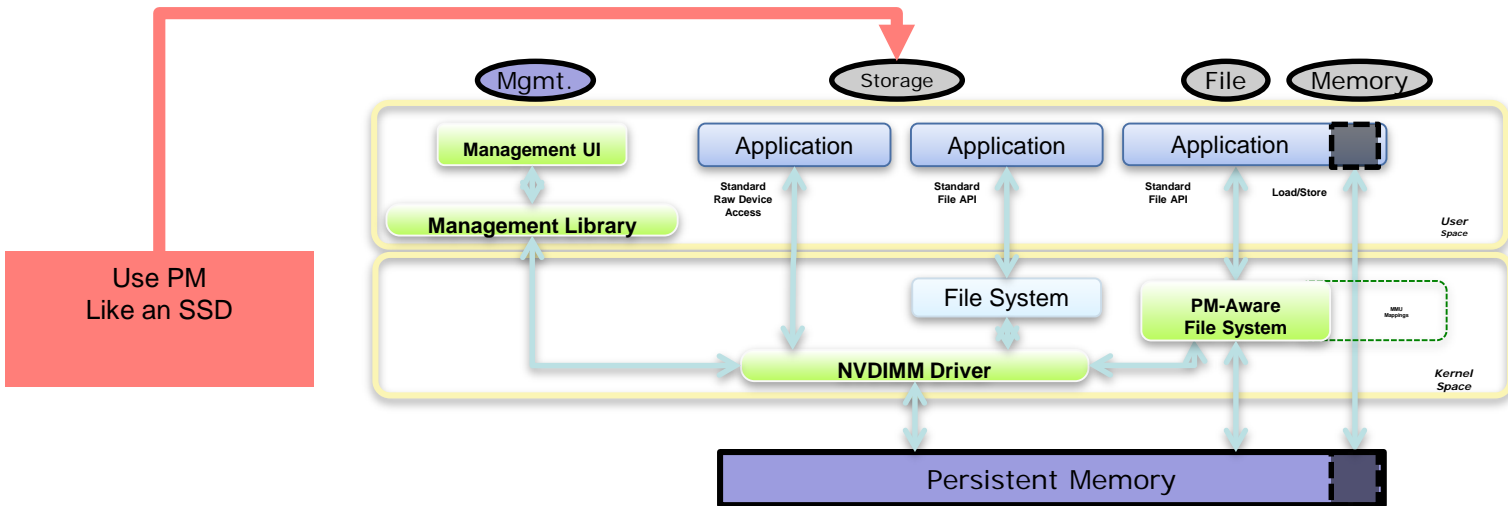
- The Programming Model includes storage APIs





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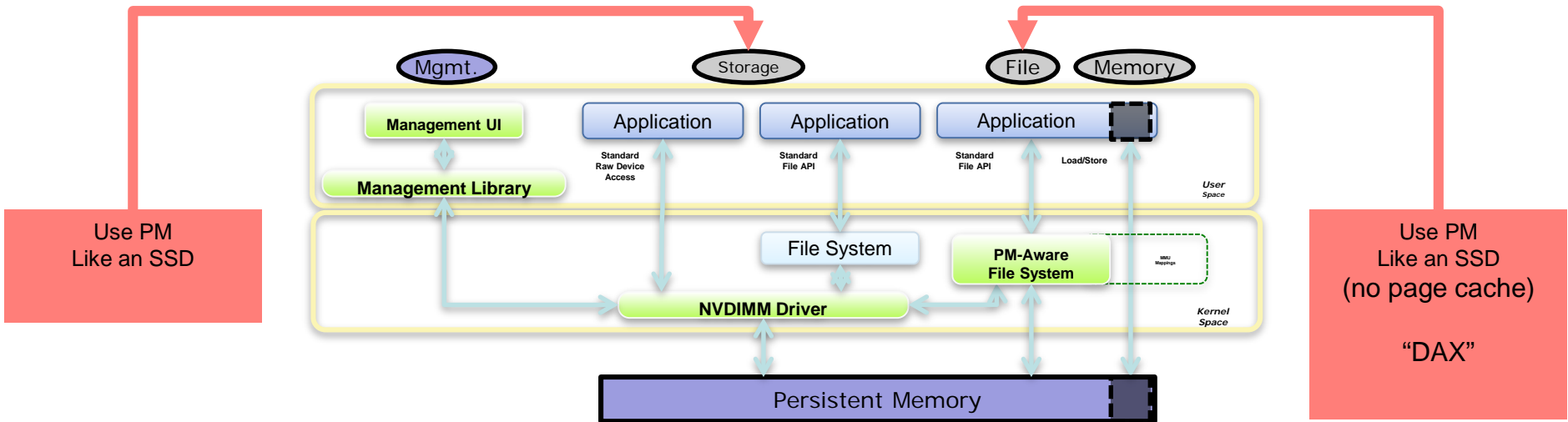
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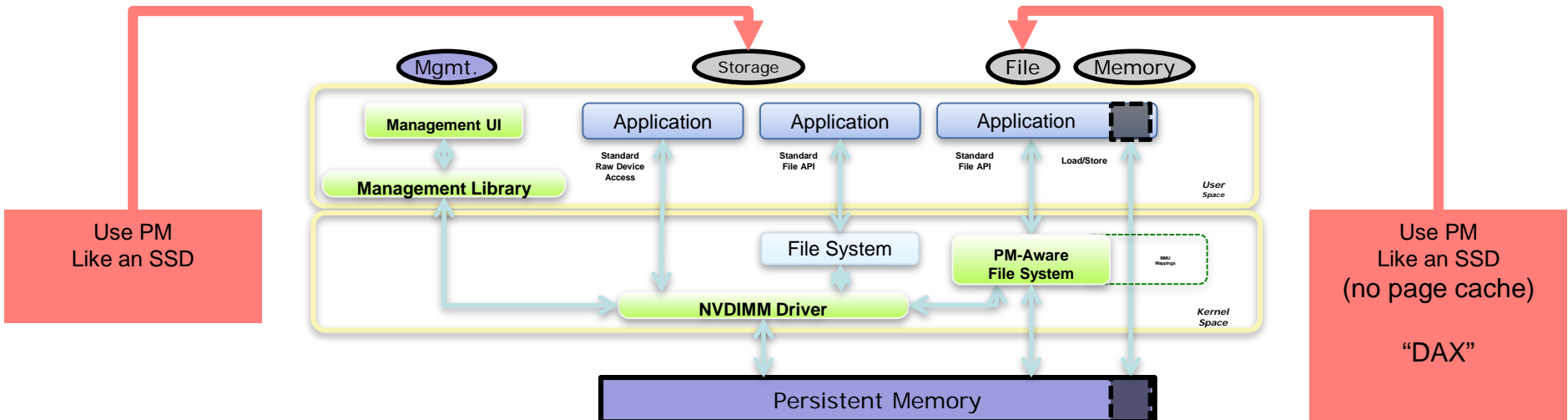
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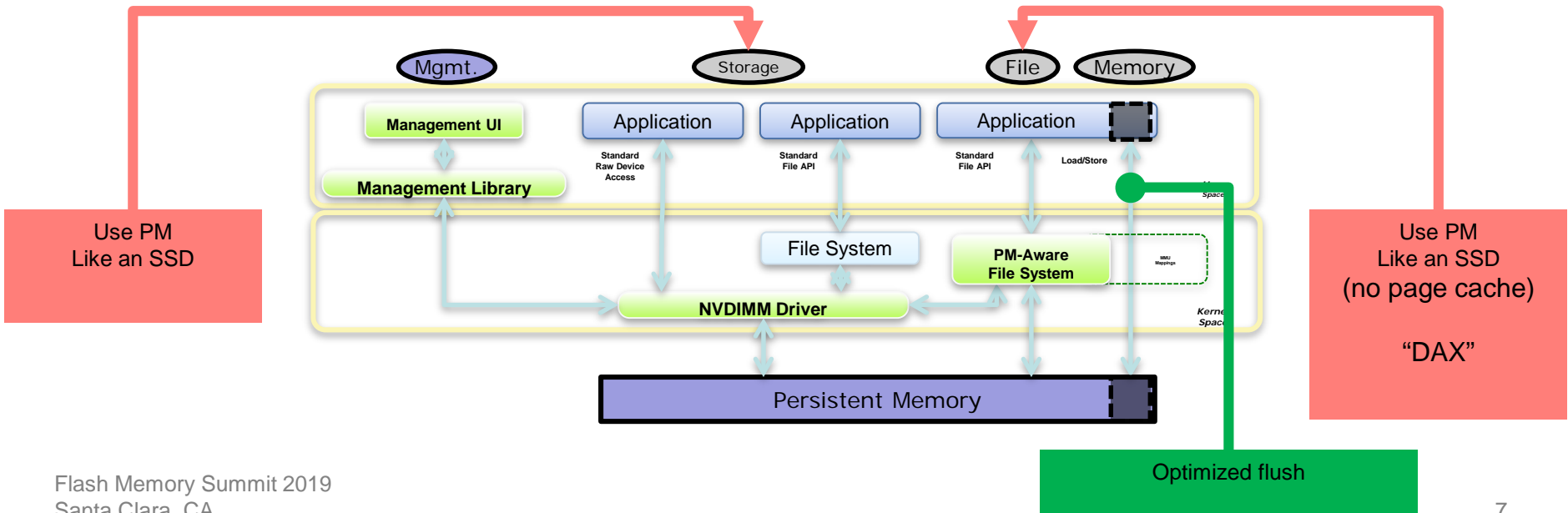
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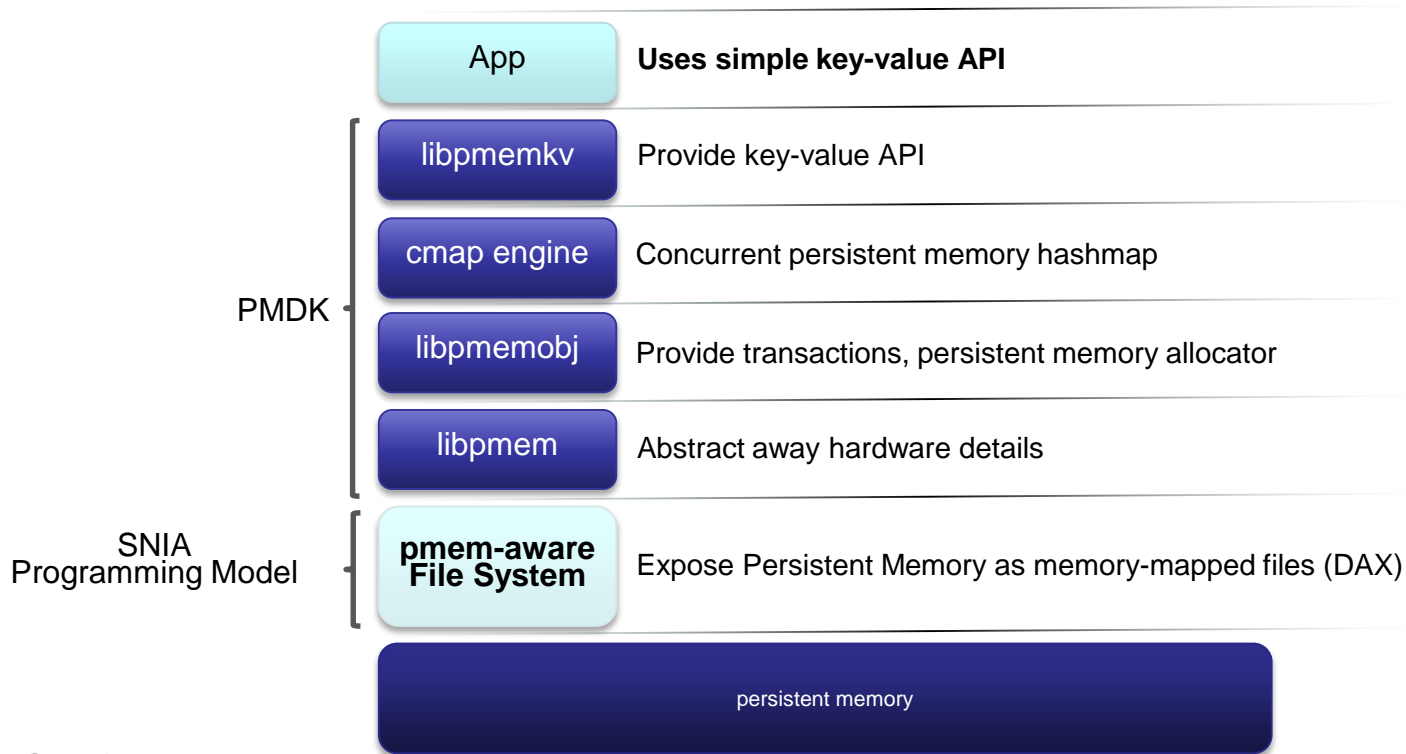
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# Building on pmem-aware Middleware







# How the Ecosystem is Shaping Up

- **Some Apps Completely Unmodified**
  - Storage APIs on pmem
  - Memory Mode (Optane DC persistent memory only)
- **Some Apps Built on pmem-aware Middleware**
  - App uses same API (i.e. Cassandra API)
- **Some Apps Made pmem Aware**
  - Databases, key-value stores
  - Some use pmem as a volatile tier