



it's about time

# Optimization strategies for in-memory analytics using Optane persistent memory

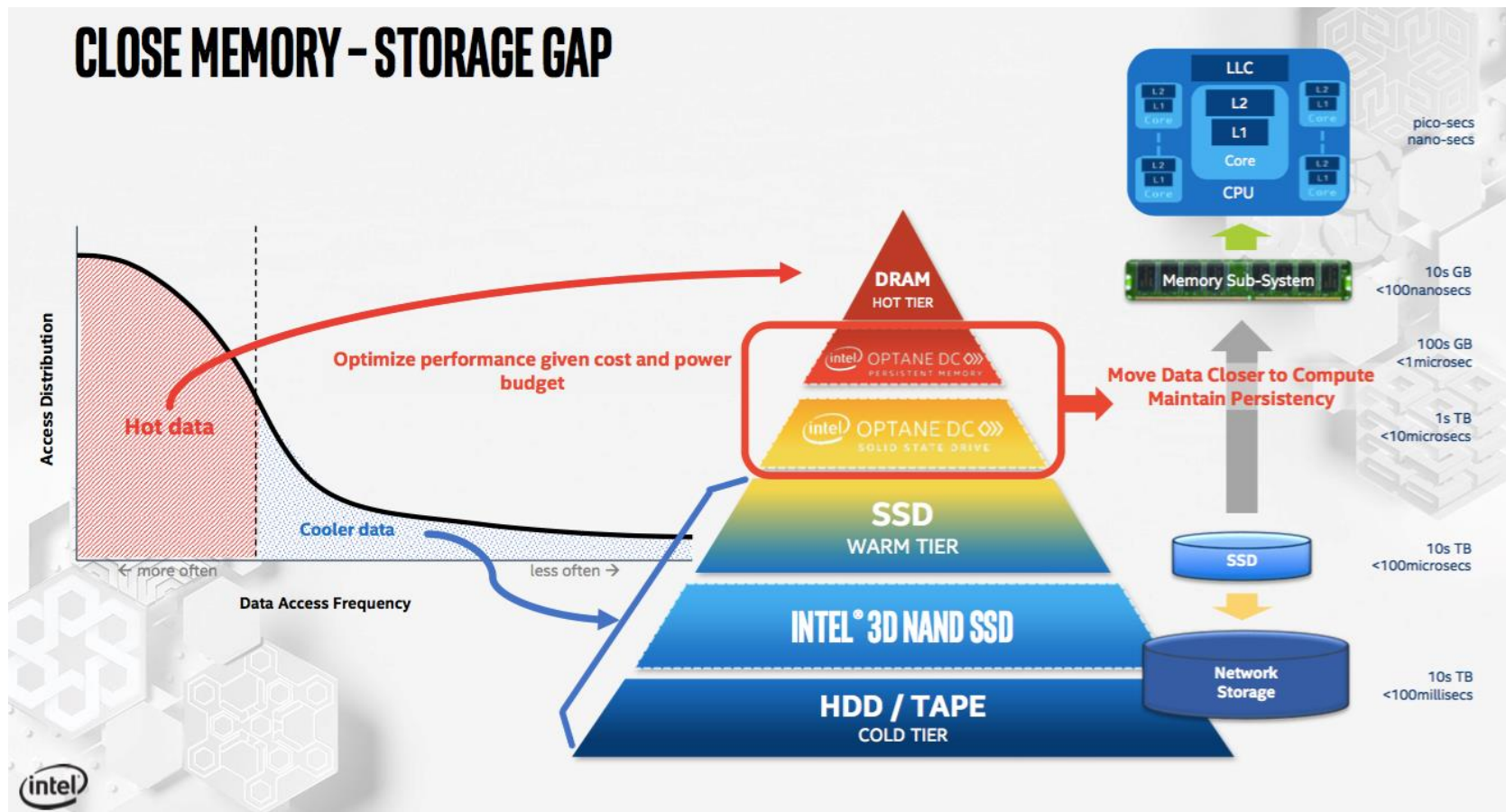
## Kx/Intel Early access program

STAC Summits, Fall 2019

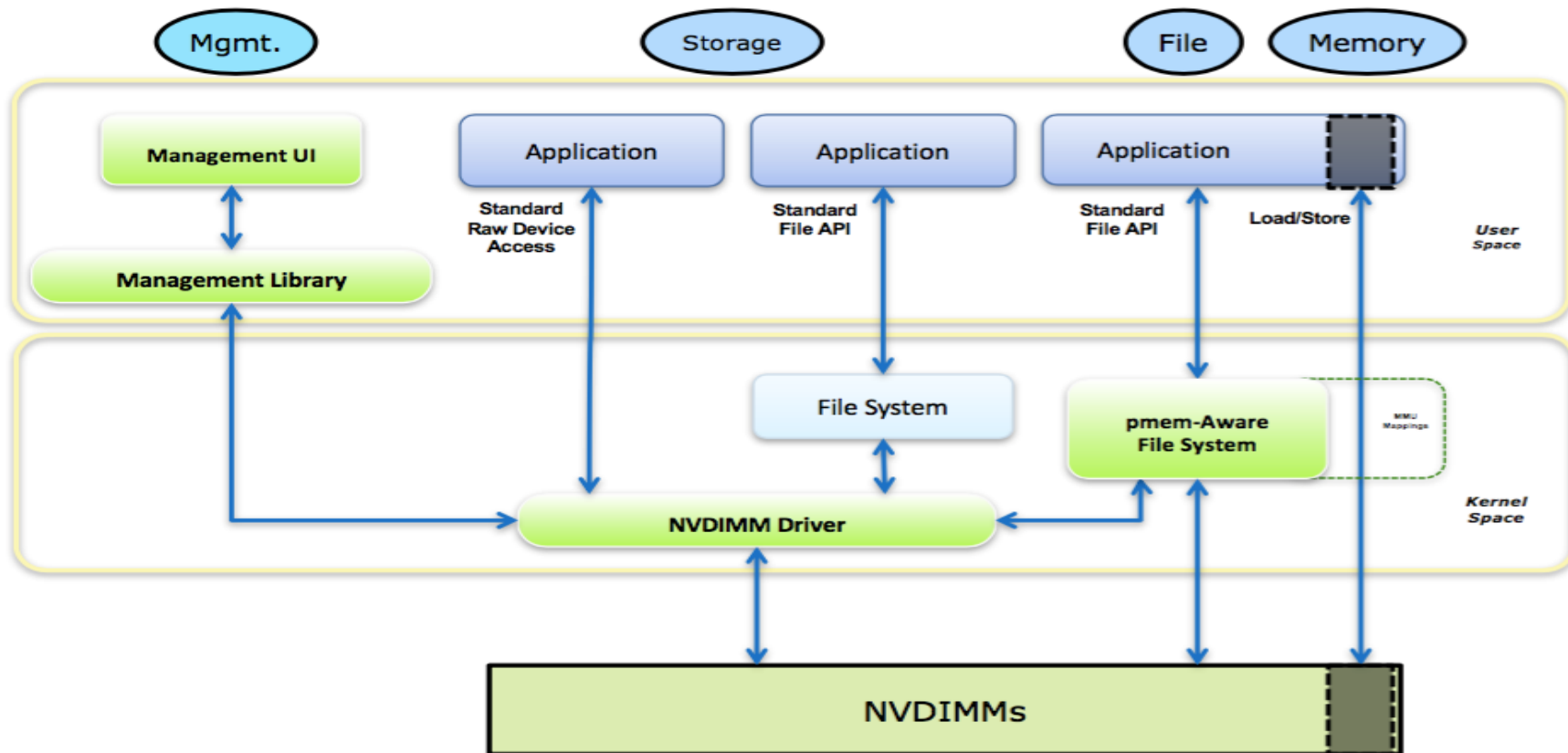
Glenn Wright  
Senior Systems Architect, Kx Systems



# Why is Optane Memory so useful for time-series data?



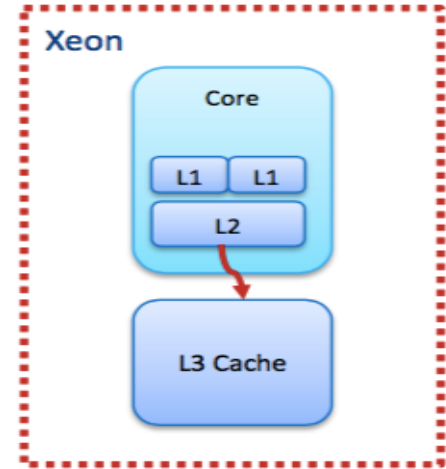
# SNIA NVM programming model supports realtime data analytics



# 1. Memory Mode

- PMEM used as Large Volatile Memory
  - Looks to SW stack as large memory
  - up to 6TB in a 2S server at 90% the performance of DRAM
- Kdb+ Create object ~ 8% to 19%
  - Read object ~ 8% to 14%

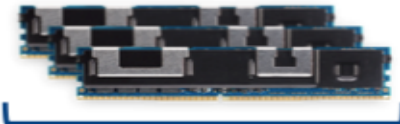
## Memory Mode



DRAM as L4 Cache  
Hidden from OS



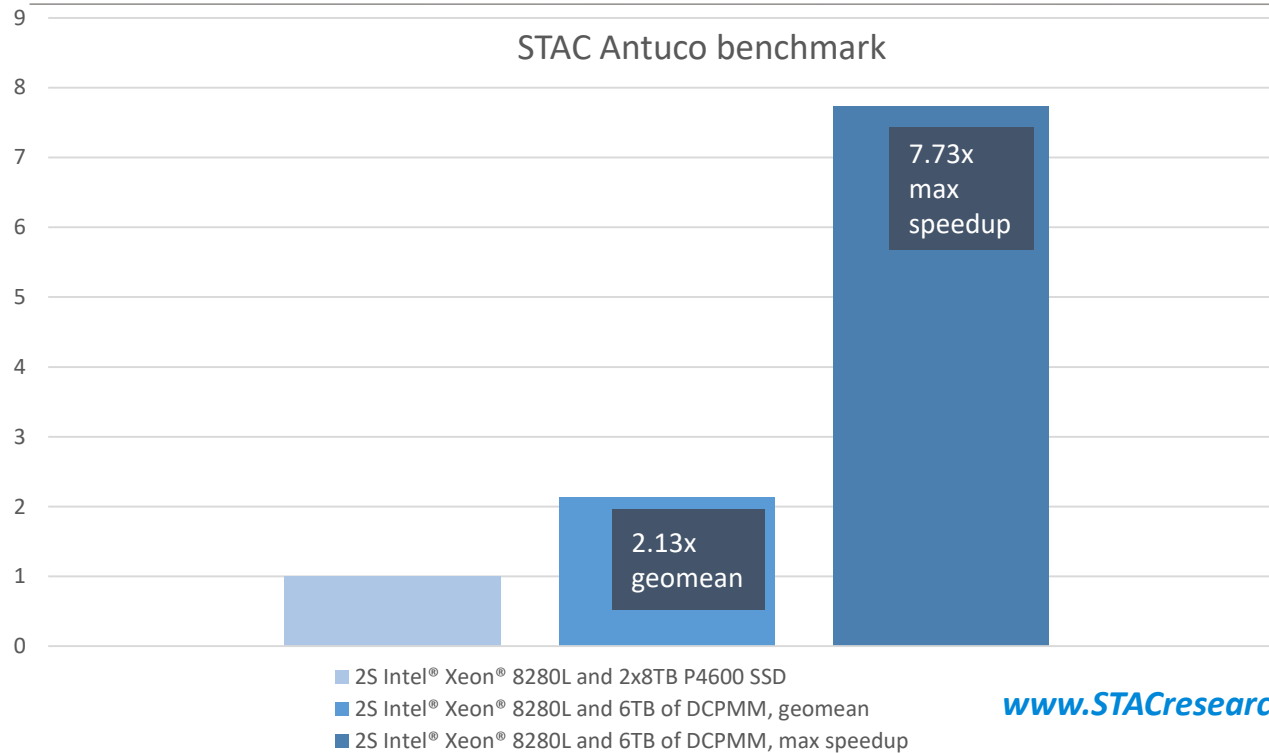
Persistent  
Memory



Volatile Memory Capacity  
visible to the OS

*Use case: RDB, massive data sets, no app change*

## 2. Persistent Storage mode (STAC-M3 Antuco)



***Finance users are encouraged to also look up the following unaudited reports from Intel:***

***SUT ID KDB190416***

***[www.STACresearch.com/KDB190323](http://www.STACresearch.com/KDB190323)***

***An excellent candidate for persistent “very hot” HDB data, viz. multi day or multi week***

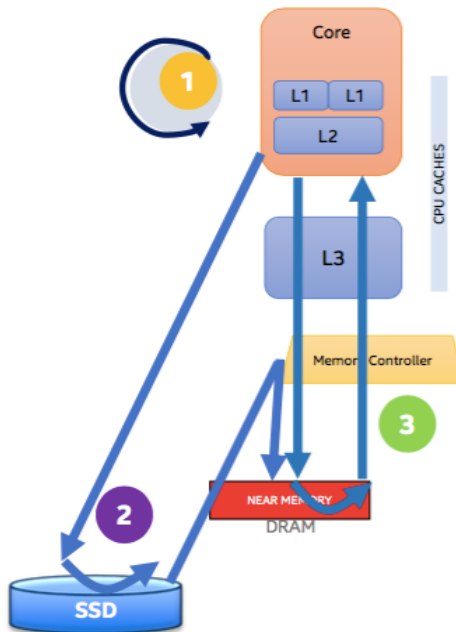
### 3. DAX “App-direct” mode

- Traditional read to page fault (disk):

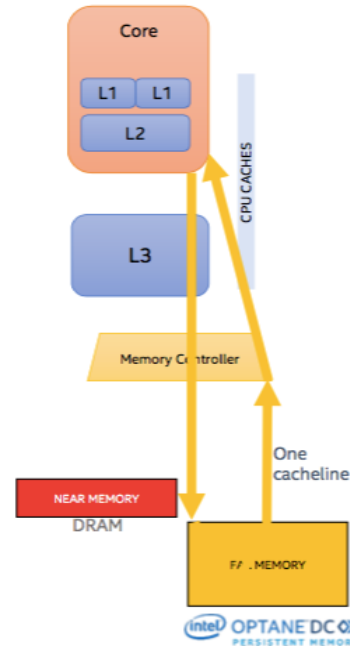
- 1 Software
- 2 4K transfer from disk
- 3 Request returned

- App Direct access memory directly
  - Avoids software and 4K transfer overhead
  - Cores can still access DRAM normally, even on same channel

Traditional Read to Page Fault



App Direct Read



**Early ACCESS for finance clients:**

- ❑ **Horizontal RDB partitioning :** Keep ‘recent’ historical data in Optane Memory, allowing multi-day queries in memory
- ❑ **Vertical RDB partitioning :** Different tables/columns residing in DRAM/Optane Memory

- ❑ Intel/Kx Early Access programme now available for Finance customers evaluating new technology
- ❑ Consulting support from Kx is co-packaged
- ❑ Intel and Kx deliver full hardware and software stack for early access evaluations
- ❑ See us at the Intel booth today, or email: [optane@kx.com](mailto:optane@kx.com) to join the EA program and get started!