2022 OFA Virtual Workshop

COMPUTATIONAL STORAGE ON THE EDGE: EXAMPLE USE CASES

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COMPUTATIONAL STORAGE: RETAIL CHAIN EXAMPLE

Essential applications with tight latency requirements	Running in 100s or 1000s of locations	With minimal or no on-site IT Staff

Challenges

- ❑ No true on-site data center
  - ❑ Limited environmental controls & floorspace
  - ❑ Low-power Servers to help with thermals
  - ❑ Low cost per Server to scale to 1000s of locations
- ❑ Software suite for centralized management

Solutions

- ➢ Computational Storage Drives
- ➢ Low-overhead Edge Computing SW

Results

- ✓ CSDs expand Server functionality
  - ✓ **Low-power & low-cost capacity expansion** via CSD hardware compute engines (HCE)
  - ✓ **Improved thermal management** from distributed computing
  - ✓ **No added physical footprint** since the HCE is integrated directly into the SSD
- ✓ Optimized Edge SW addresses system constraints & management
  - ✓ Brings **HCI** capabilities to the Edge
  - ✓ **Remote management** of 1000s of sites
  - ✓ **Reduced CPU power** to meet SLAs
  - ✓ **Reduced Server costs** via lower-grade CPUs, less DRAM, and smaller form factors

COMPUTATIONAL STORAGE: DATA SECURITY EXAMPLE

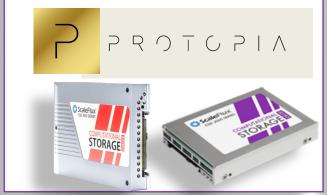| Companies must protect against mis-use of data	Generated in 10s, 100s, or 1000s of Edge locations	And transferred to the Core or Cloud for processing

Challenges

- ❑ Each movement of data creates an exposure opportunity
  - ❑ Man-in-the-middle intercept
  - ❑ Unintended inferencing / model training

Solutions

- ➤ Computational Storage Drives
- ➤ Data Transformation Application

Results

- ✓ Original data never leaves the drive, *only a representation* of the data is transferred
- ✓ CSDs running Data Transformation enhance data security
  - ✓ **Original data protected** from man-in-the-middle malicious actors
  - ✓ **Transformations minimize the potential for mis-use** of data for unintended inference/ model training while enabling the intended task to be performed