AEROSPIKE USER SUMMIT 2018

AEROSPIKE

Maximizing the Benefit of Flash Storage for Aerospike

Hao Zhong
Chief Executive Officer and Co-Founder
ScaleFlux

Corporate

US Incorporated
Oct 2014

HQ San Jose, CA

Beijing, China

Worldwide Sales & Support

Technology & Expertise

Industry's first **Computational Storage** in production

30 Patents filed, 4 issued; compute & storage integrated architecture

Go-to-Market

Hyperscale & webscale end users; system OEM/ODMs & integrators
GA since mid-2017 with many end users running production workloads

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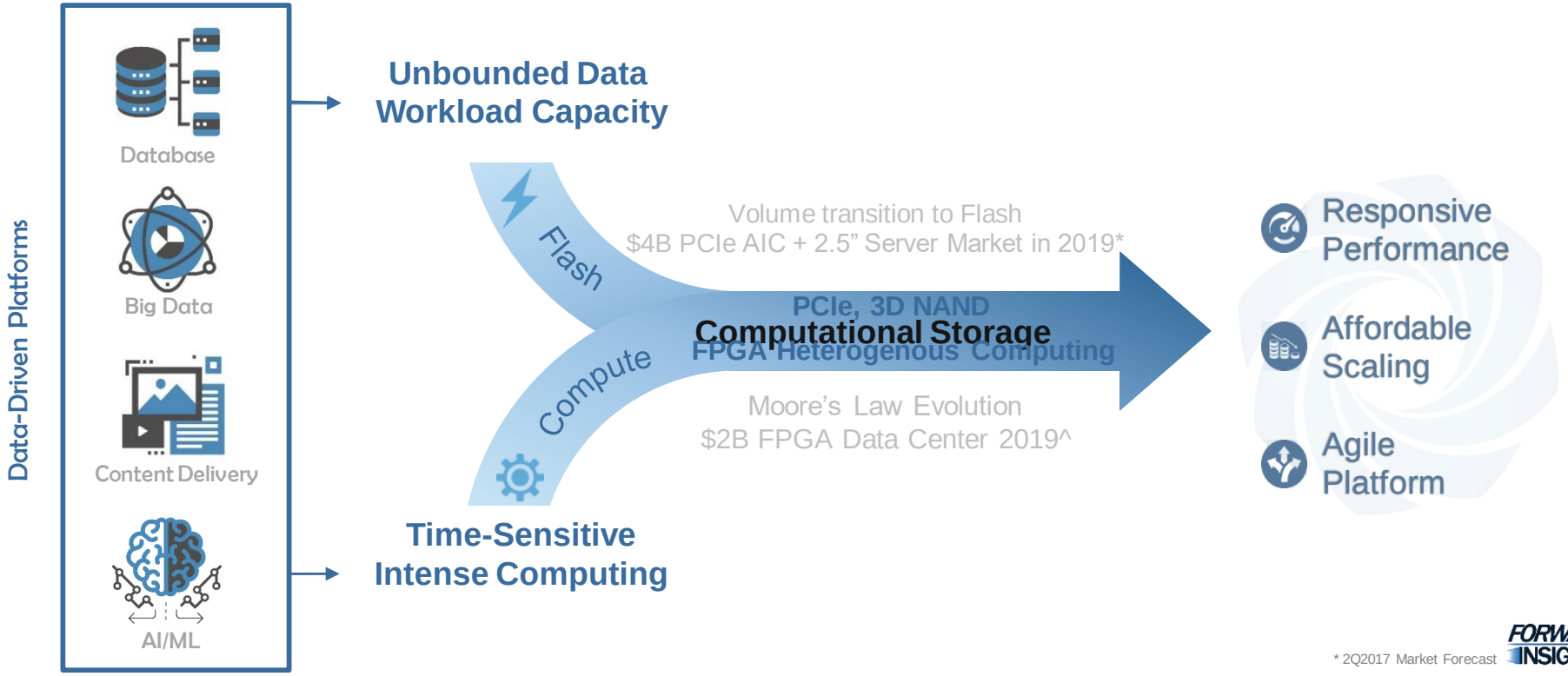
Unleashing Data Driven Applications at Scale

Computational Storage Solution Pioneer



* 2Q2017 Market Forecast FORWARD INSIGHTS

^ ScaleFlux Estimate: $1.7B Intel/Altera 2016 Rev; $2.3B Xilinx FY2017 Rev; 45% and increasing Data Center %

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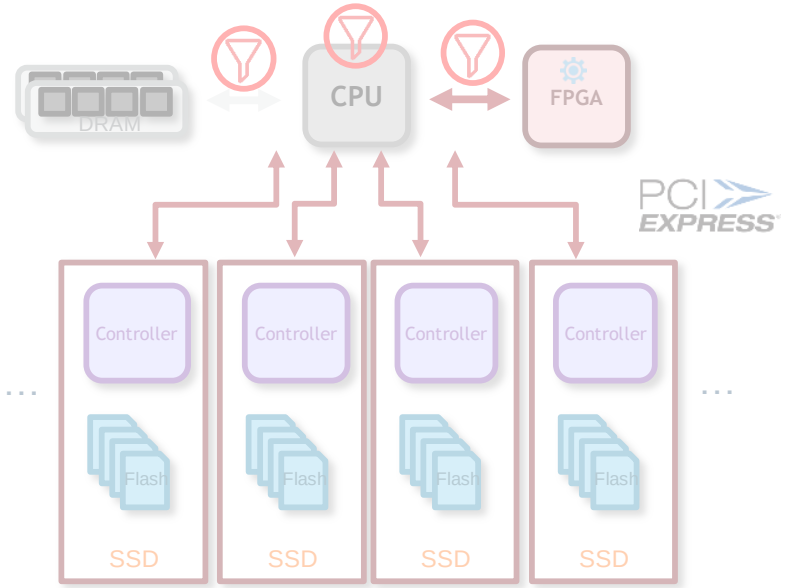
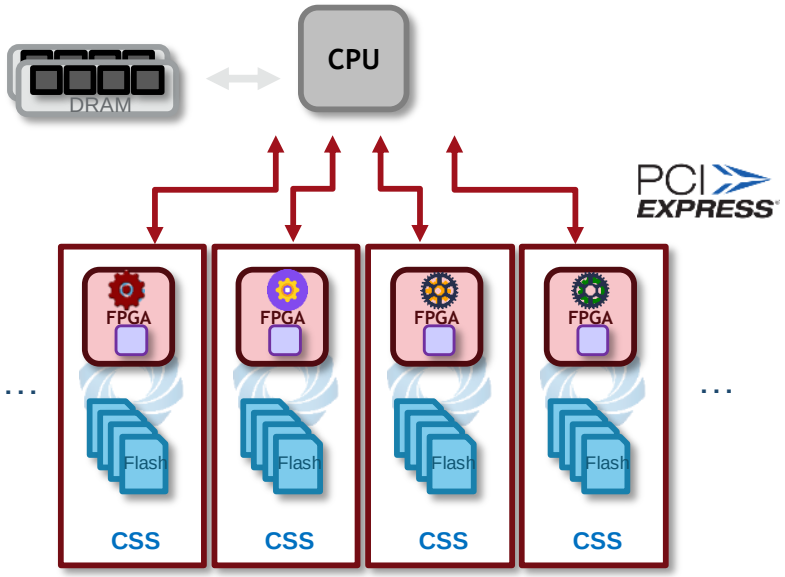
Processor Driven



- CPU & Memory I/O bottlenecks
- Single FPGA compute engine function
- Specific FPGA plug-in socket required
- **No parallelism**

Data-Driven



- Balanced compute & storage I/O
- Multiple FPGA computing functions
- Multiple FPGAs easily plug-in via storage
- **Maximize parallelism**

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The Fastest NoSQL Database Demands The Fastest Flash Storage

Aerospike optimizes data storage on Flash by bypassing the file system, which takes advantage of low-level read and write patterns

ScaleFlux provides workload tunability to balance extremely high transactions with low, consistent latency

Easily replace NVMe/PCIe SSD or up to 6 SATA SSDs

- **Leading transactions per second with predictable performance**
- **Easy-to-deploy agile flash storage infrastructure**
- **Capacities up to 7.68TB per drive**

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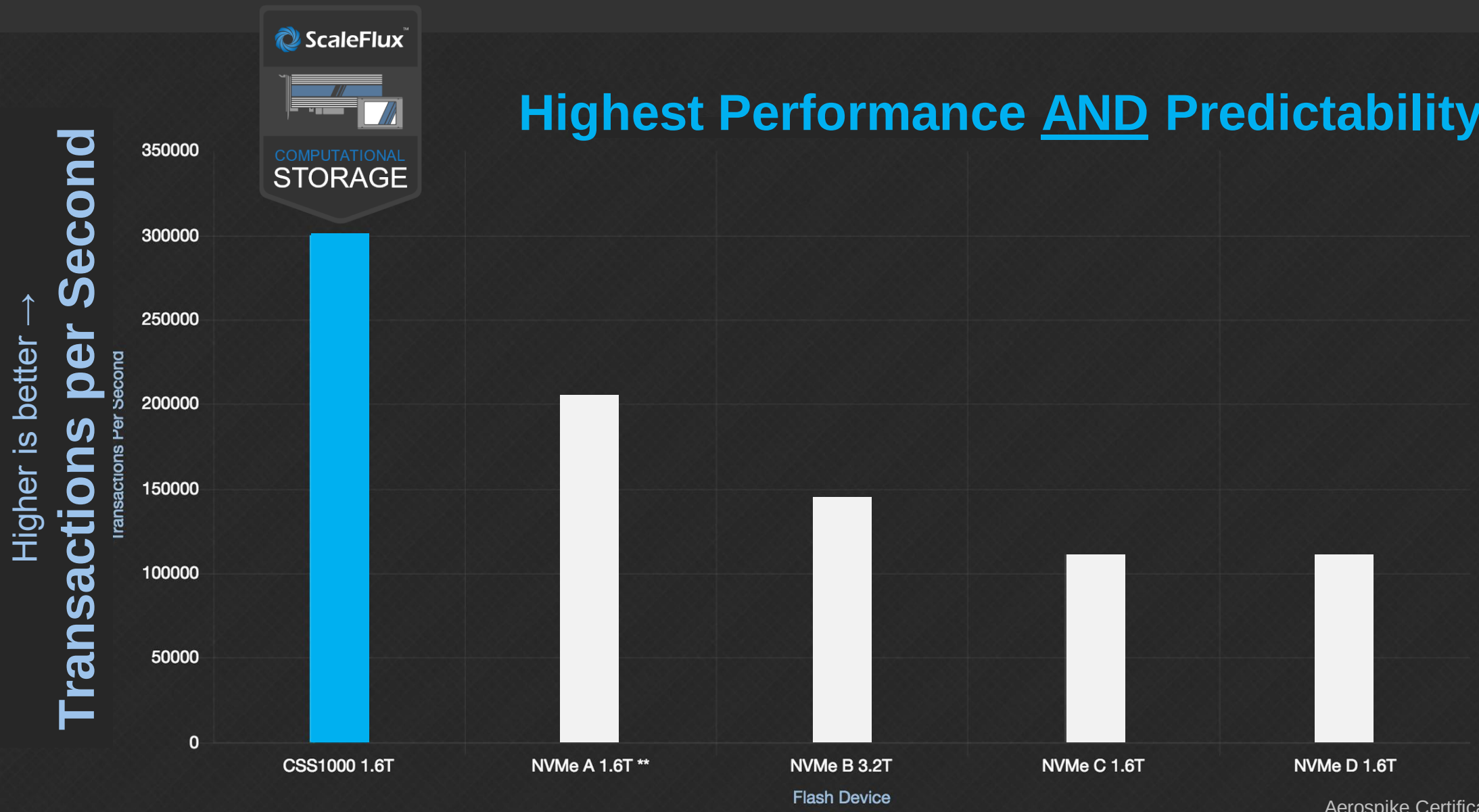
Highest Performance AND Predictability

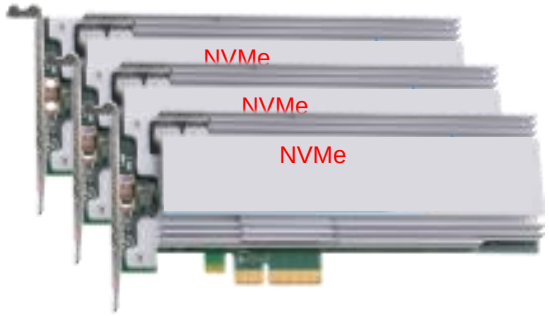


Aerospike Certification Tool Benchmark
https://www.aerospike.com/docs/operations/plan/ssd/ssd_certification.html

Optimize Your Infrastructure Spend

- **ScaleFlux enables high TPS with low, consistent latency**
- **Dramatic infrastructure spend reduction for the same performance**
  - CapEx: 3X less drives
  - OpEx: 3X less components & power savings

110K TPS/card



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300K TPS/card

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CSS-1000 (U.2) Available to Large Scale Customers

Through Dell EMC ESI

- **Dell EMC Extreme Scale Infrastructure (ESI)**
  - Delivers tailored solutions to scale-out markets such as service providers, carriers, financial service institutions
- **ESI has validated the CSS-1000 U.2 with the Dell EMC PowerEdge R640 rack server**
  - Full warranty and support included
- **Other server options available through qualified, end-user customer request to ESI (esi@dell.com)**

PowerEdge R640 Rack Server

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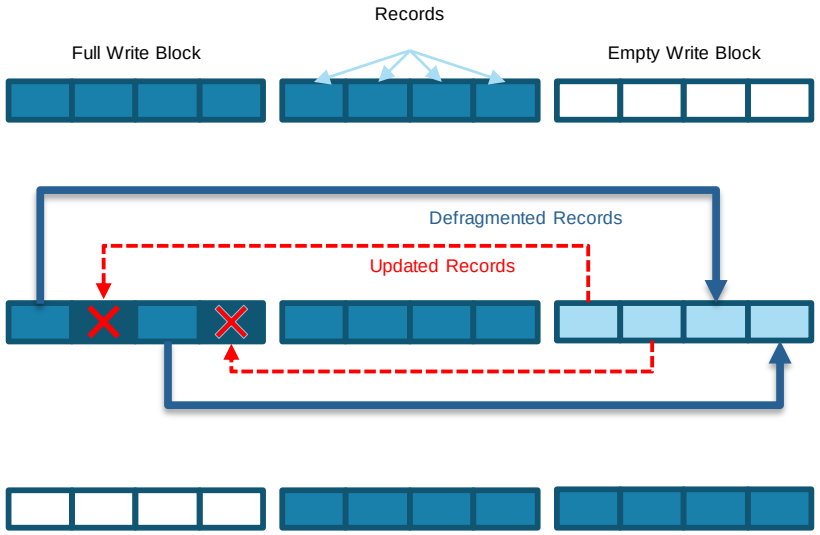
WHAT IF

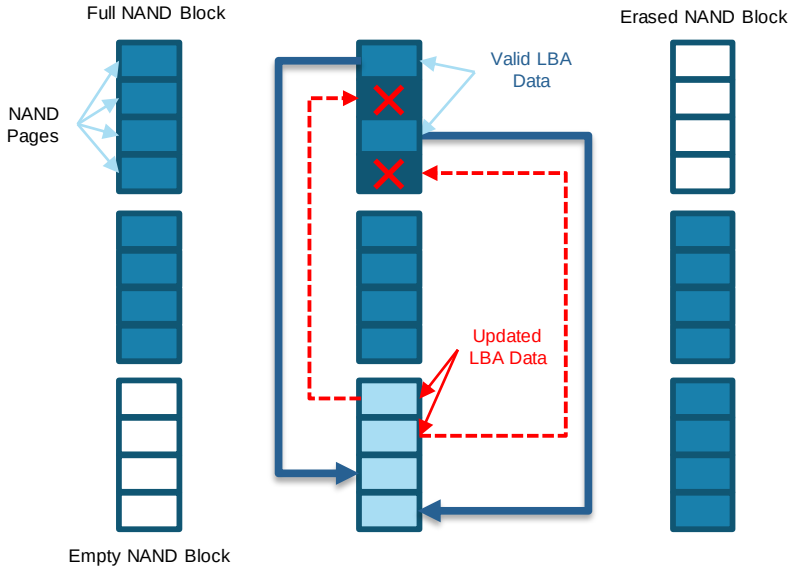
Data and Storage Management Innovation

- **Defragmentation**
  - Database reclaims filesystem space that is no longer needed



Group?

- **Garbage Collection**
  - Storage device reclaims physical space as LBAs become invalid



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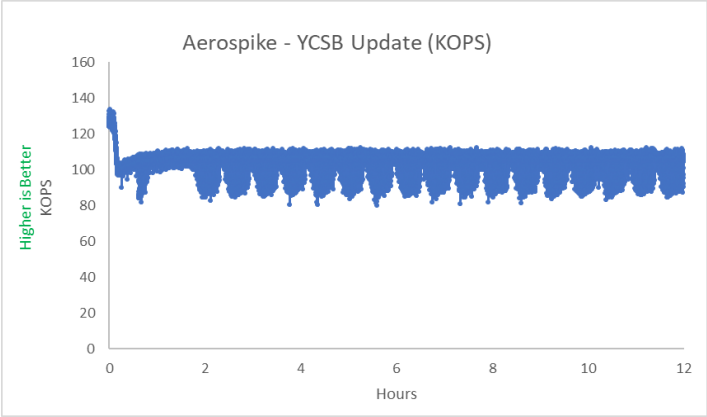
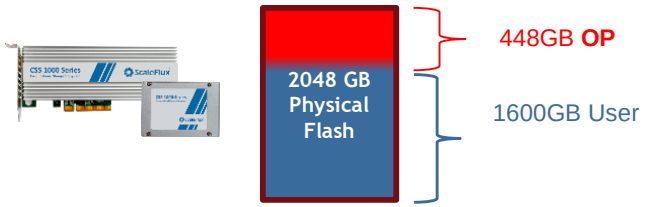
Performance, Capacity & Significant Predictability Gains

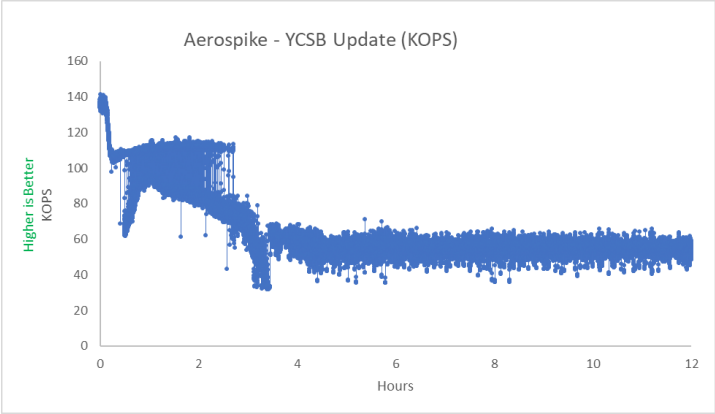
Baseline
Separate Defrag & GC

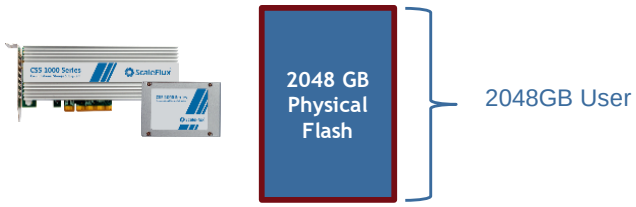




Avg 106 KOPS Steady State
166M 4K Records

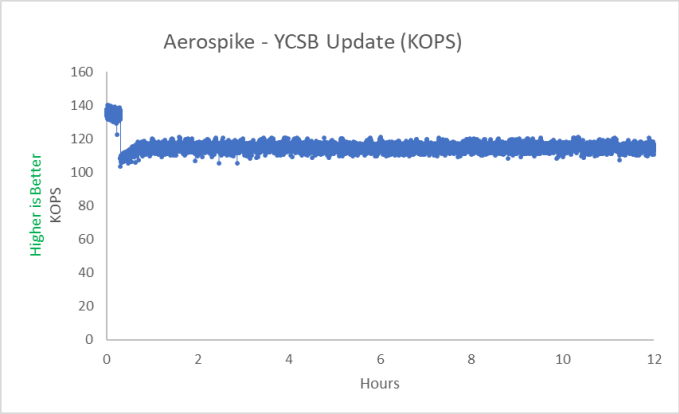
0% OP Flash Storage
Separate Defrag & GC

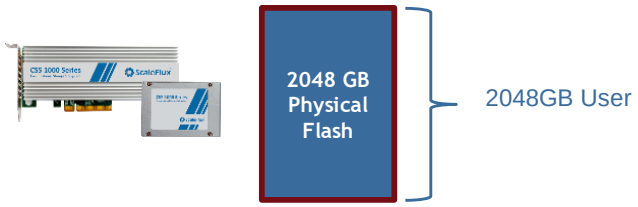




Avg 50 KOPS Steady State
215M 4K Records (+30%)

0% OP Flash Storage
Group Defrag & GC





Avg 115 KOPS Steady State (+8.5%)
215M 4K Records (+30%)

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The Best Gets Even Better – No Compromises!

	Separate Defrag & GC	Group Defrag & GC
Performance	Bottlenecked by simultaneous SSD GC and DB Defrag	✓ Highest Transactions per Second
Predictability	Additional latency incurred with both GC and DB Defrag	✓ Tightest Performance Predictability
Endurance	Significant write amplification for data movement to reclaim space	✓ Up to double the lifetime
Affordability (Capacity)	Full physical capacity limited by over-provisioning for GC functions	✓ 30%+ more records in same physical capacity

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Roadmap of Increasing Value for Aerospike

Highest TPS Flash Storage

Optimized DB/Flash Storage Management

Aerospike Enterprise Edition

- Performance ↑ 10-20%
- Capacity Utilization ↑ 30%
- Endurance ↑ 2X

HW Accelerated Functions

- In-line Compression
- Encryption

Production Target

Now

4Q18

2019

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In Conclusion

- **Big gains through combined software & hardware innovation**
- **Unsurpassed Performance, Predictability, Endurance, Affordability**
- **Expect even greater gains as the solution is tuned**
- **Super simple to deploy (just like an SSD)**
- **Additional accelerated features underway**

- **About ScaleFlux**
  - HQ in Silicon Valley with Worldwide Sales & Support
  - Leader in Computational Storage & Application Acceleration
  - Ready to support you POC or production deployment today!

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Thank You

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ScaleFlux™