



Flash Memory Summit

QLC Value with No Compromise! Extended Performance, Reliability and Drive Life



- Yuyang Sun – Solidigm – QLC Product Marketing Manager



- Tim Amundsen – Pliops – Sales Engineer

2022 FMS Session: DCTR-101-1, Tuesday Aug 2nd 830am

Solidigm™ Quad Level Cell (QLC) NAND Leads Industry

Highest Density, Lowest TCO

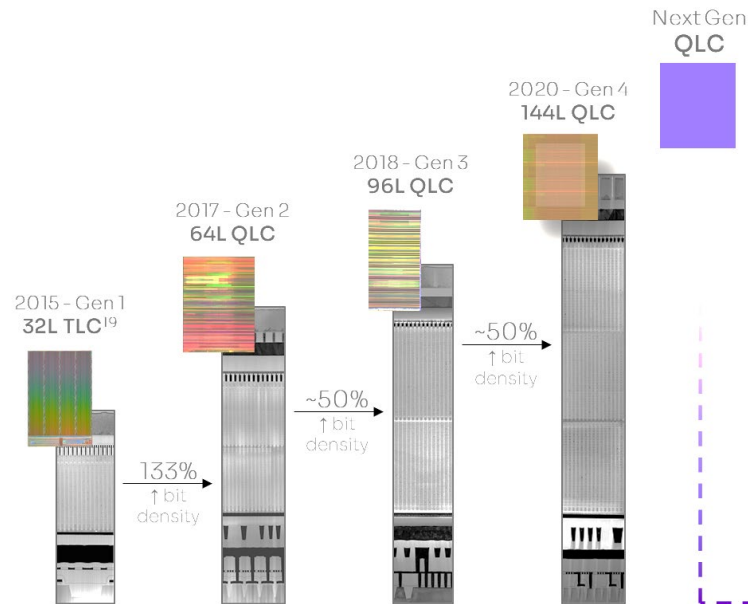
CapEx Savings
Reduced Cost/GB

up to
30%
lower \$/GB
versus Solidigm TLC equivalent¹⁴

OpEx Savings
Reduced 5-year Operational Cost

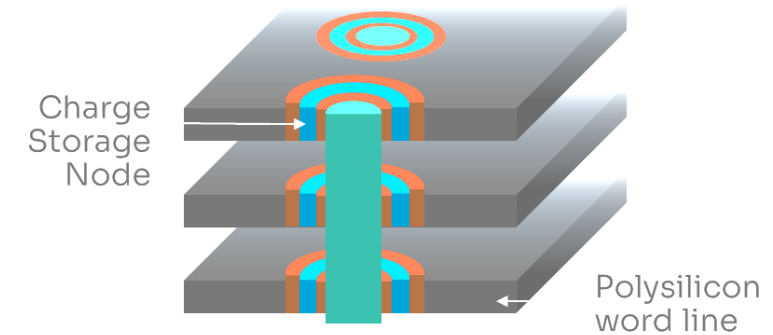
up to 3.8x lower power cost ¹⁵	up to 2.8x reduced cooling cost ¹⁶
up to 20x greater rack consolidation ¹⁷	up to 8x fewer drive replacements ¹⁸

4th Gen QLC NAND



Superior PE Cycle – 3K

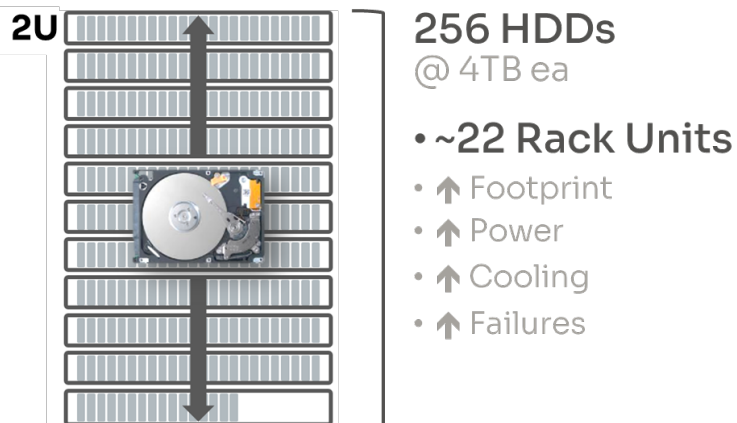
Floating Gate NAND Technology



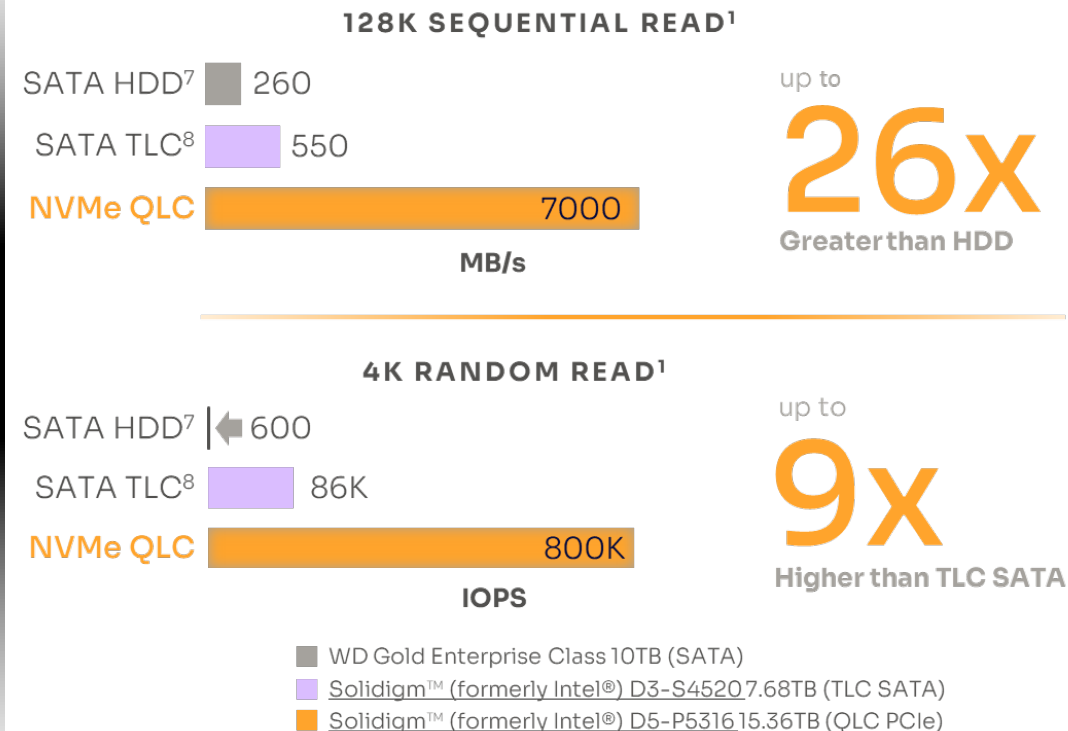
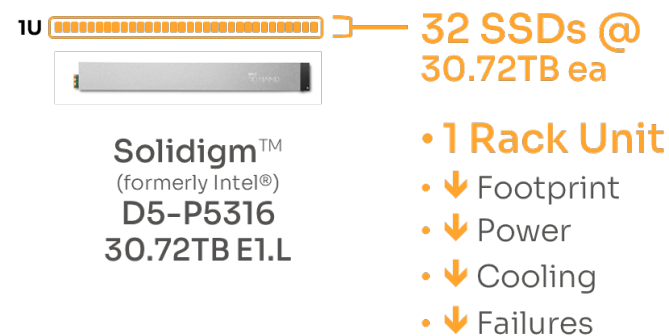
- Discrete charge storage node
- Good P/E voltage threshold window and strong cell isolation
- Better fit for **high density die/drives**
- **Proven scalability to higher bits/cell**

Solidigm™ QLC – High Density Meets High Performance

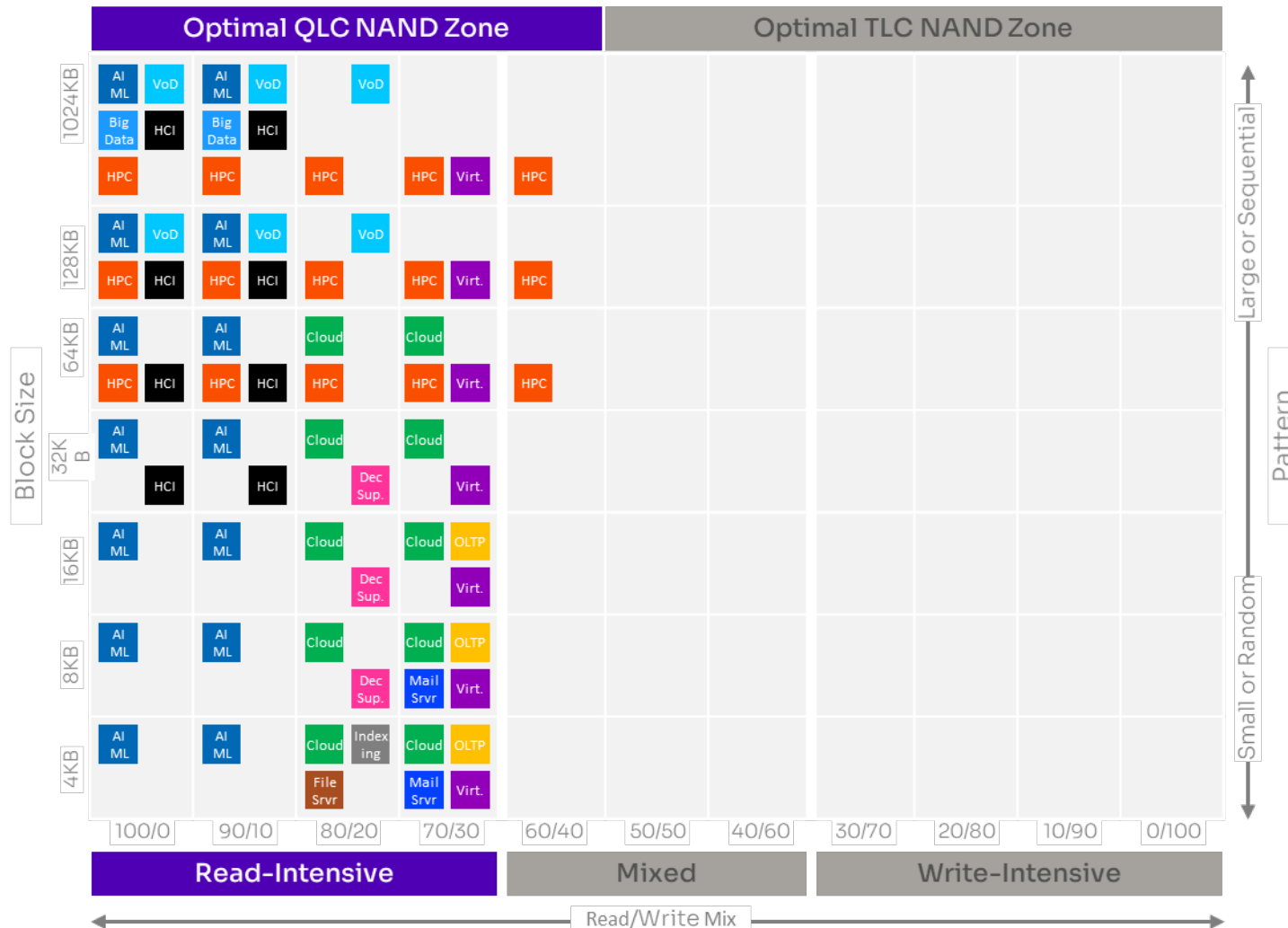
1 Petabyte of HDDs



1 Petabyte of QLC SSDs¹³



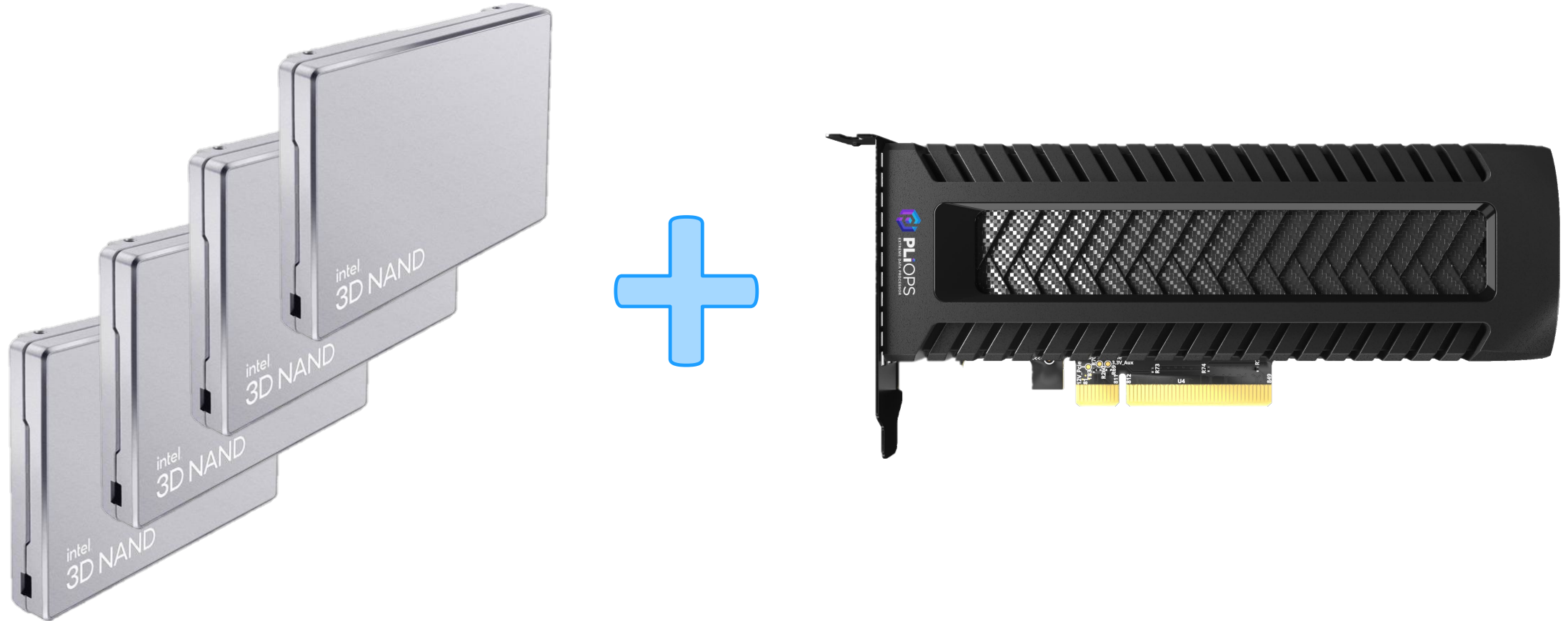
Solidigm™ QLC Removes Scalability Bottleneck



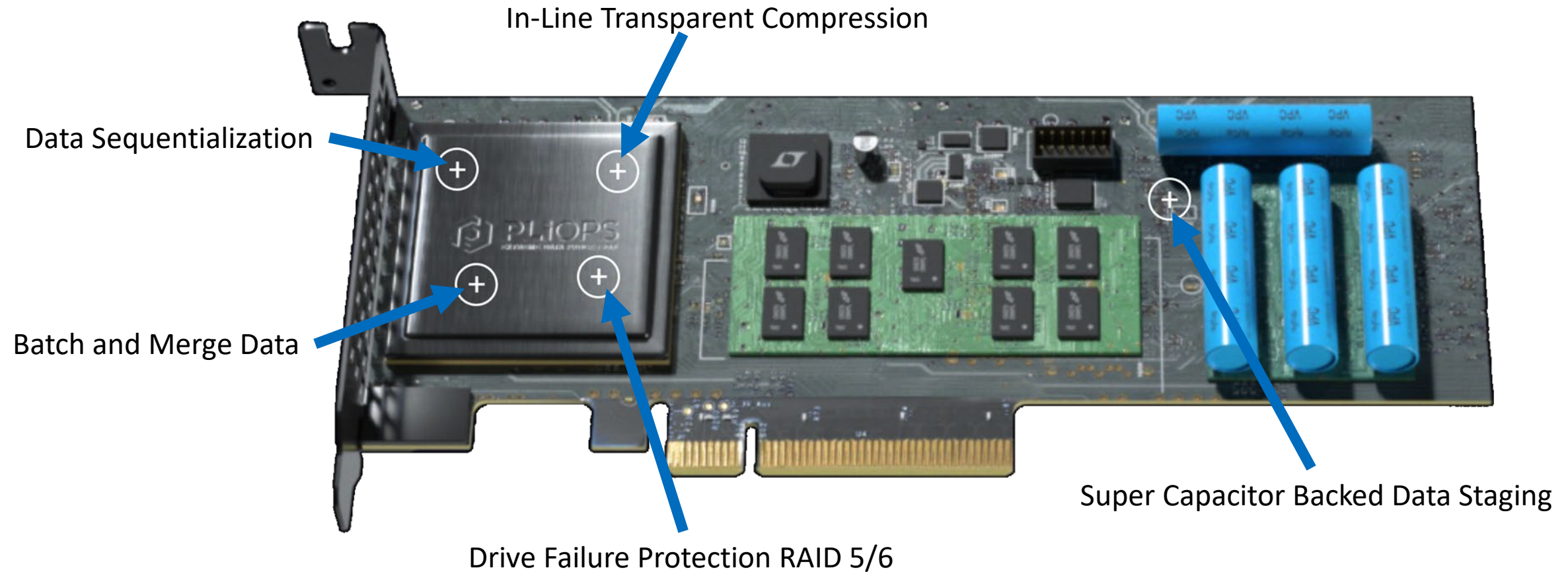
QLC SSDs are **optimized for read-intensive workloads** needing rapid access to vast datasets:

- AI/ML data pipelines
- Big data/analytics
- CDN Video on Demand (VoD)
- Cloud storage
- HCI
- HPC
- Virtualization
- File server
- Mail server
- Decision support system
- OLTP database
- Indexing

Solidigm QLC & Pliops Extreme Data Processor

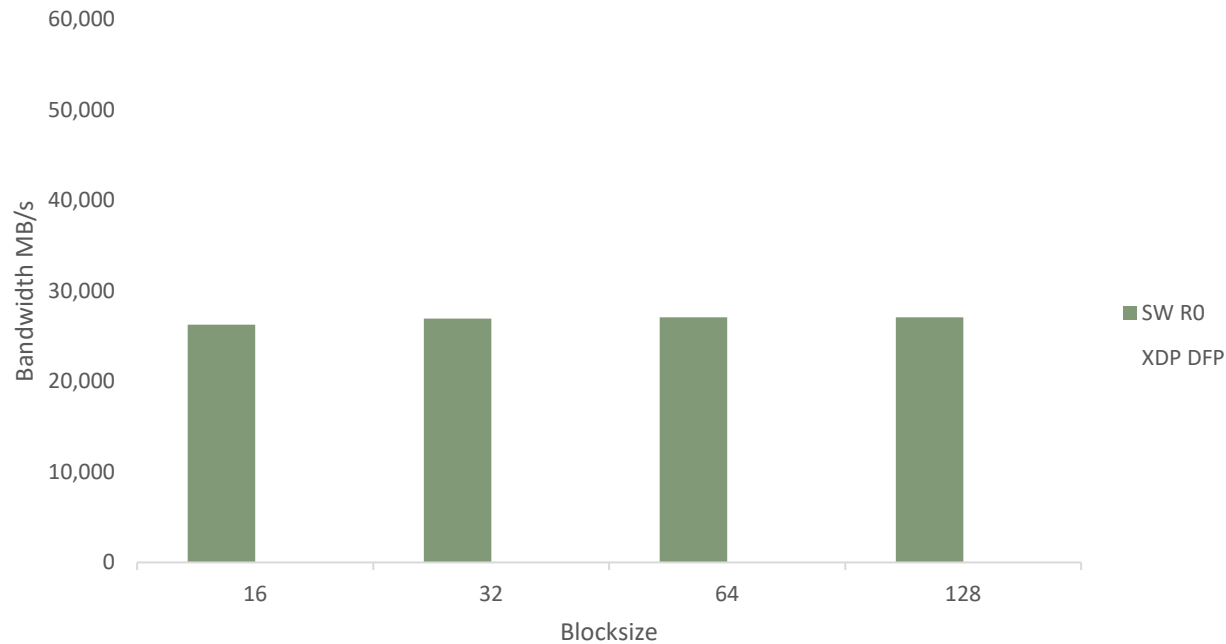


Pliops Extreme Data Processor

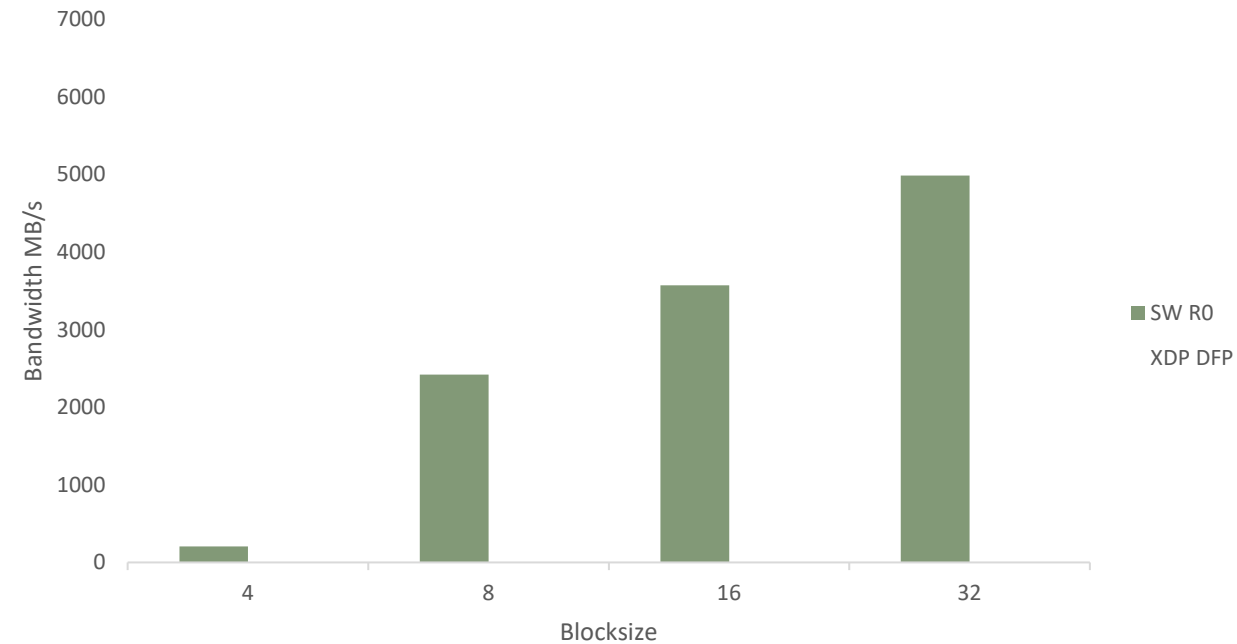


Pliops XDP for Increased Sequential Performance

Sequential Read



Sequential Write



Test Configuration:

Dell R750 with Dual Xeon 8380 and 2TB of DDR4

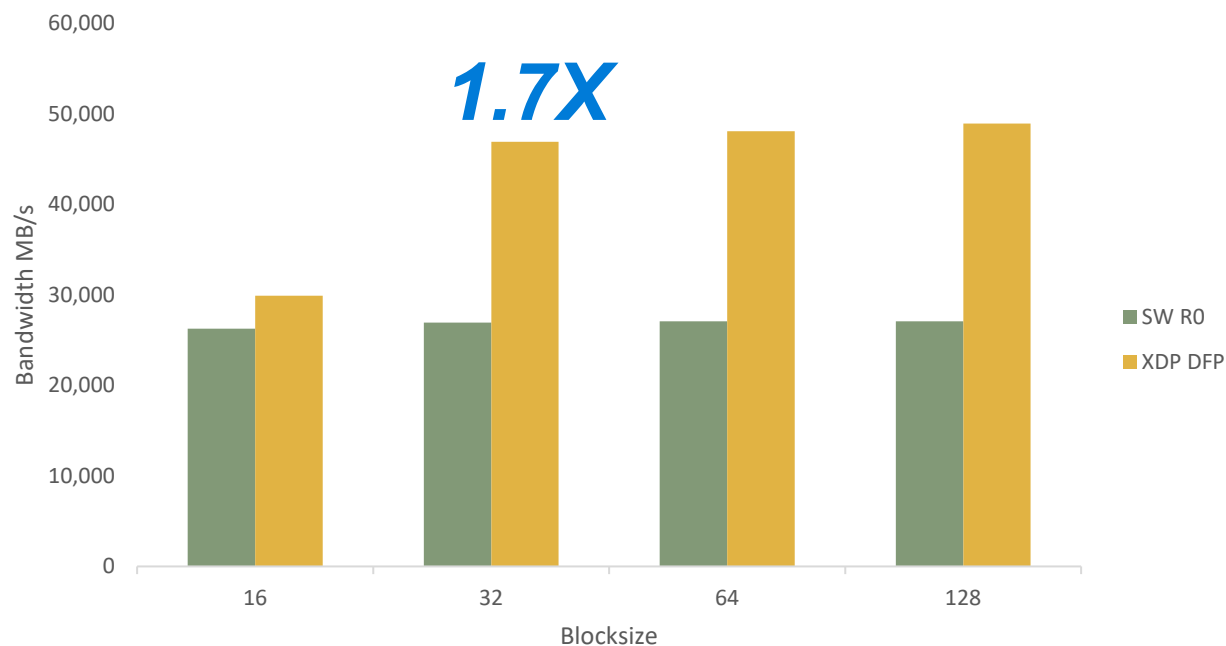
Four Solidigm P5316 30.72TB QLC SSDs

Software RAID 0 or XDP RAID 5

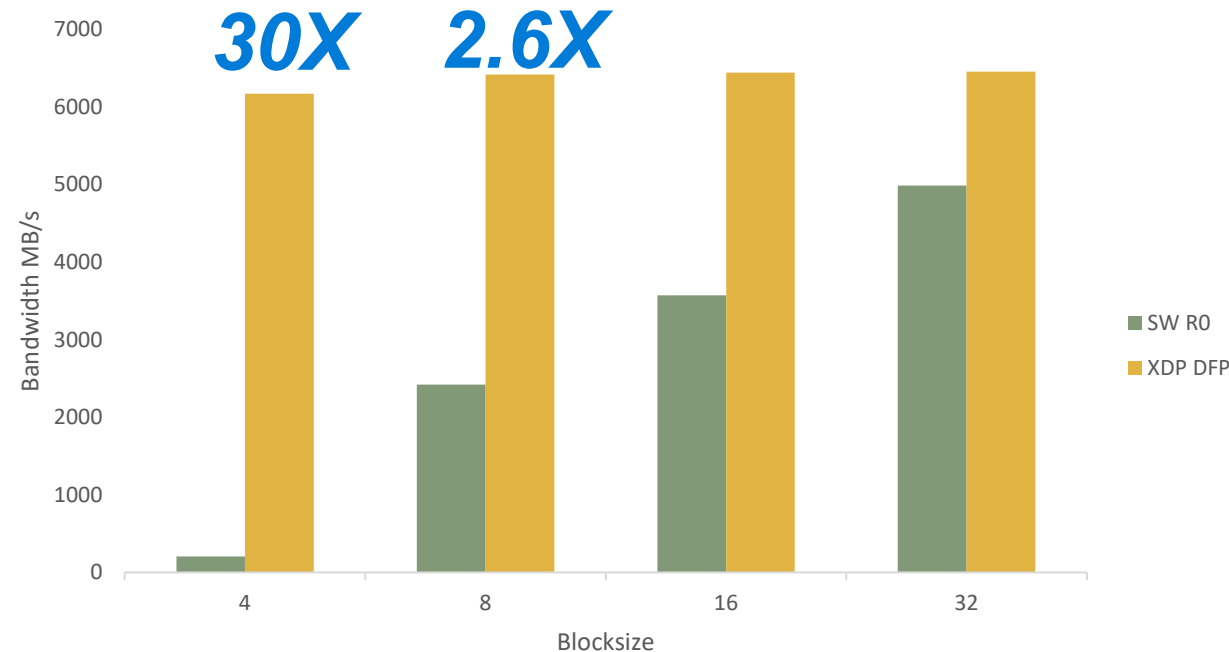
FIO: high QD with Compressible Data

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Sequential Read



Sequential Write



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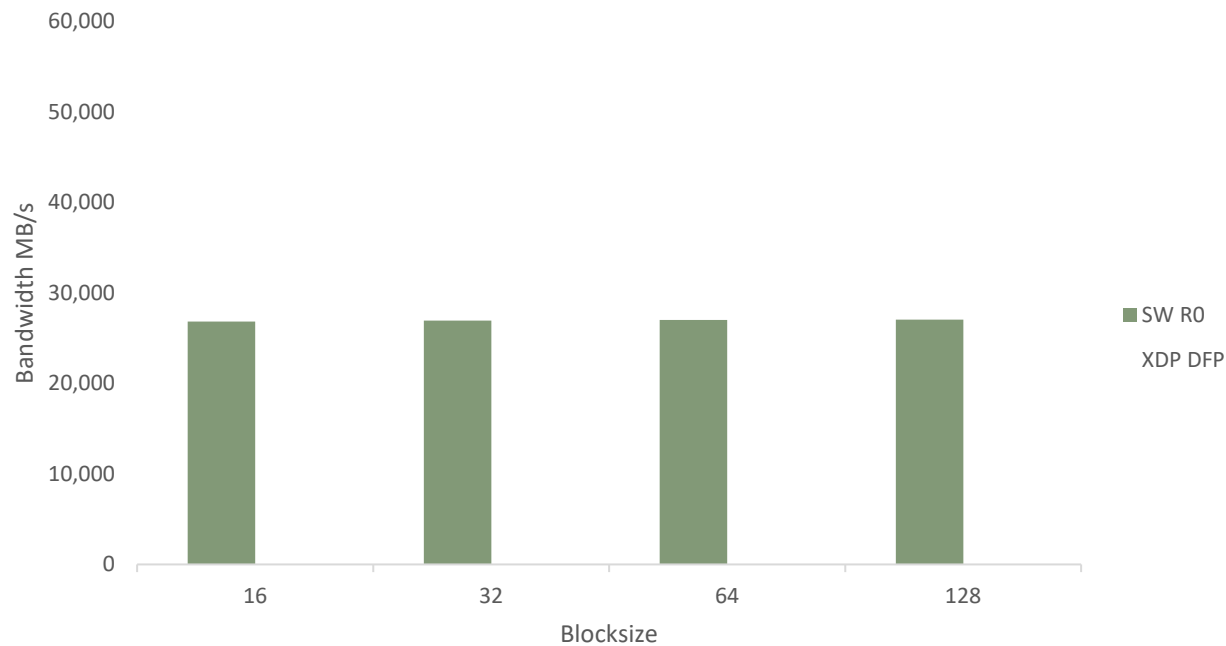
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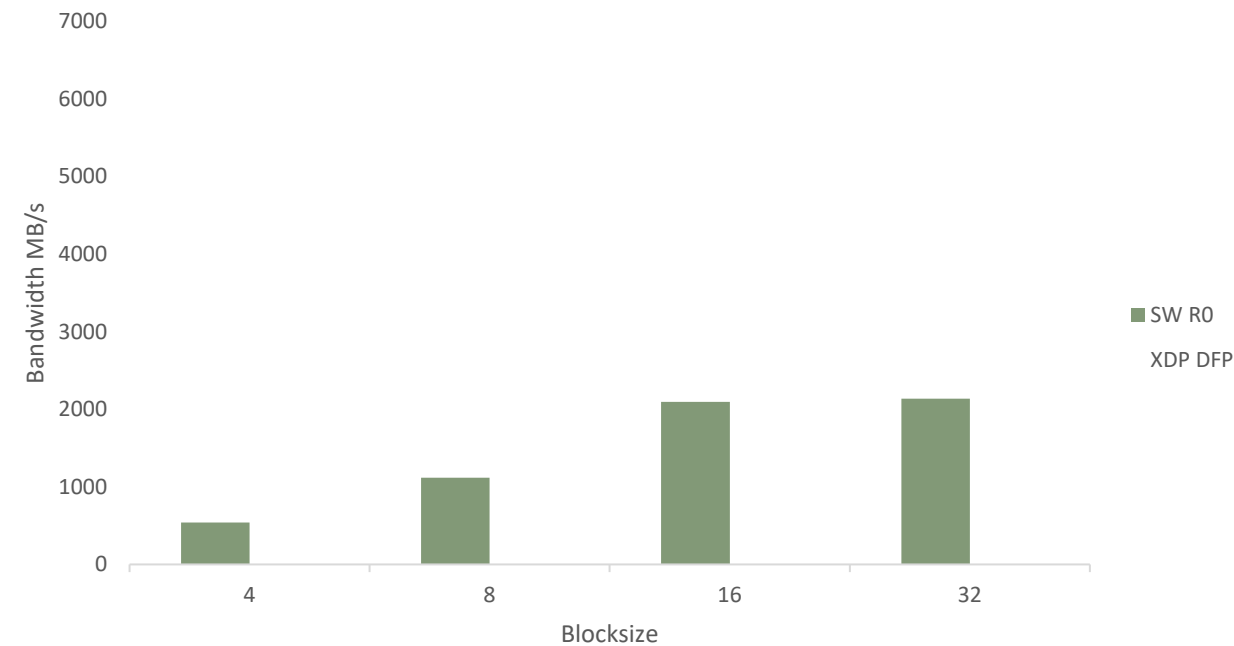
FIO: high QD with Compressible Data

Pliops XDP for Increased Random Performance

Random Reads



Random Writes



Test Configuration:

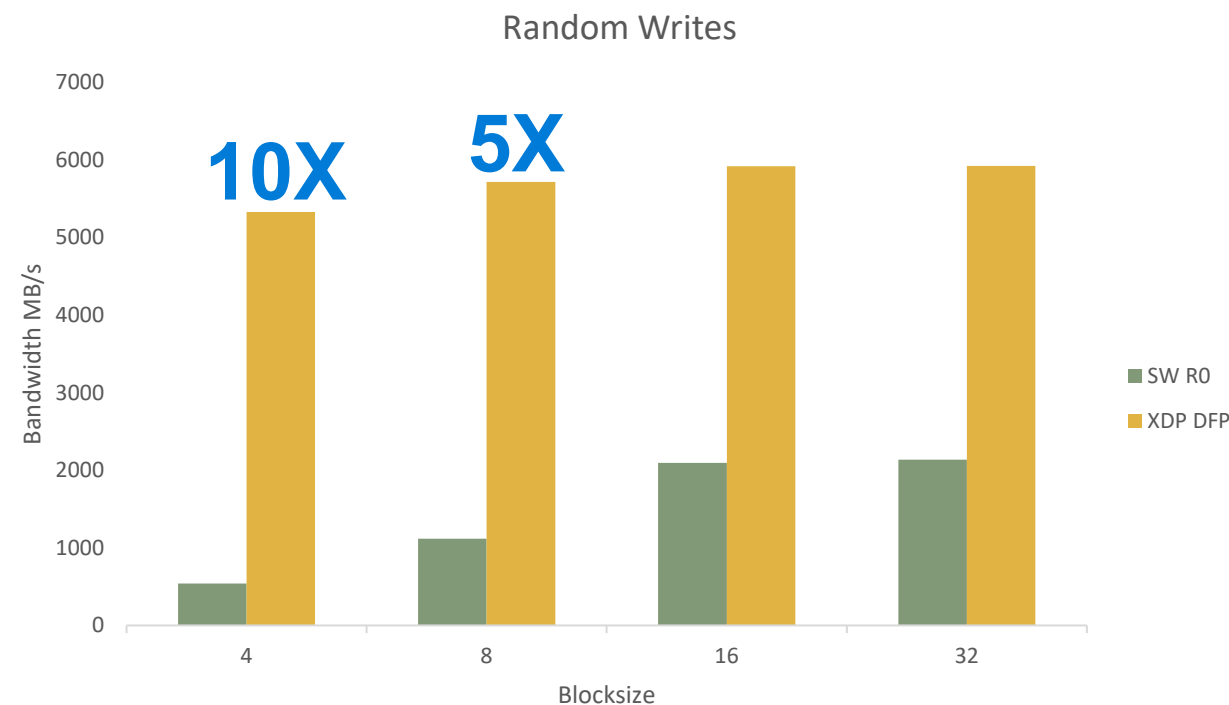
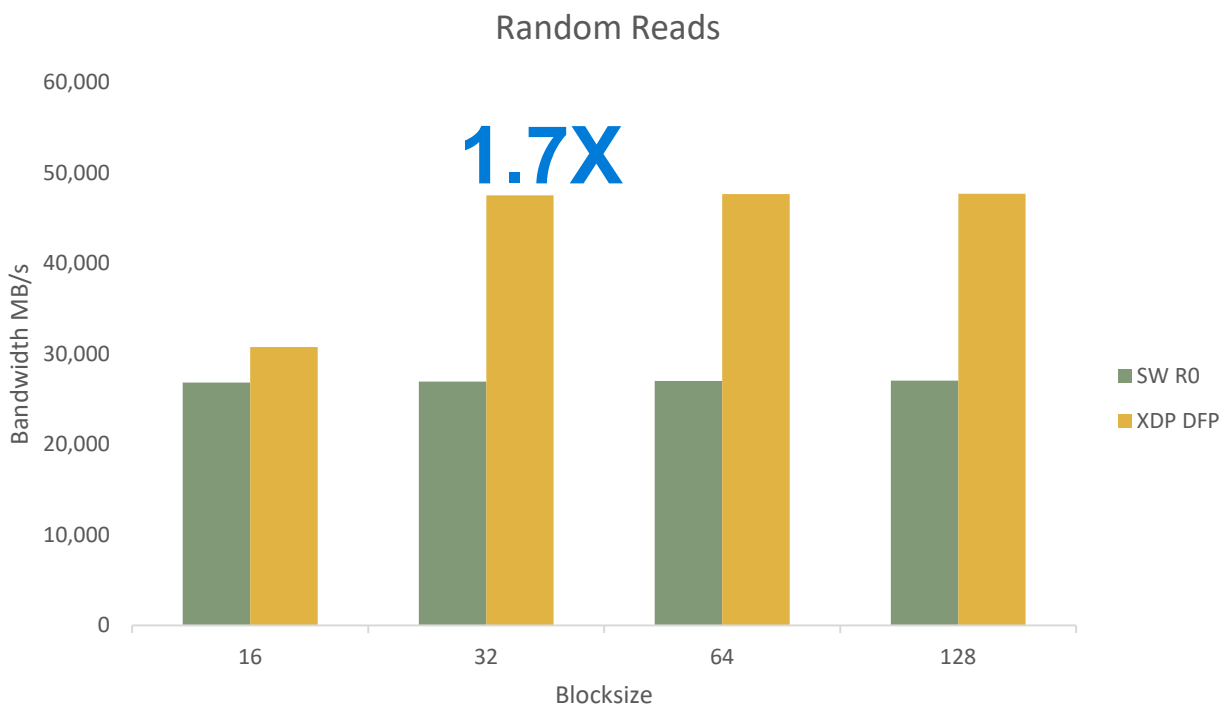
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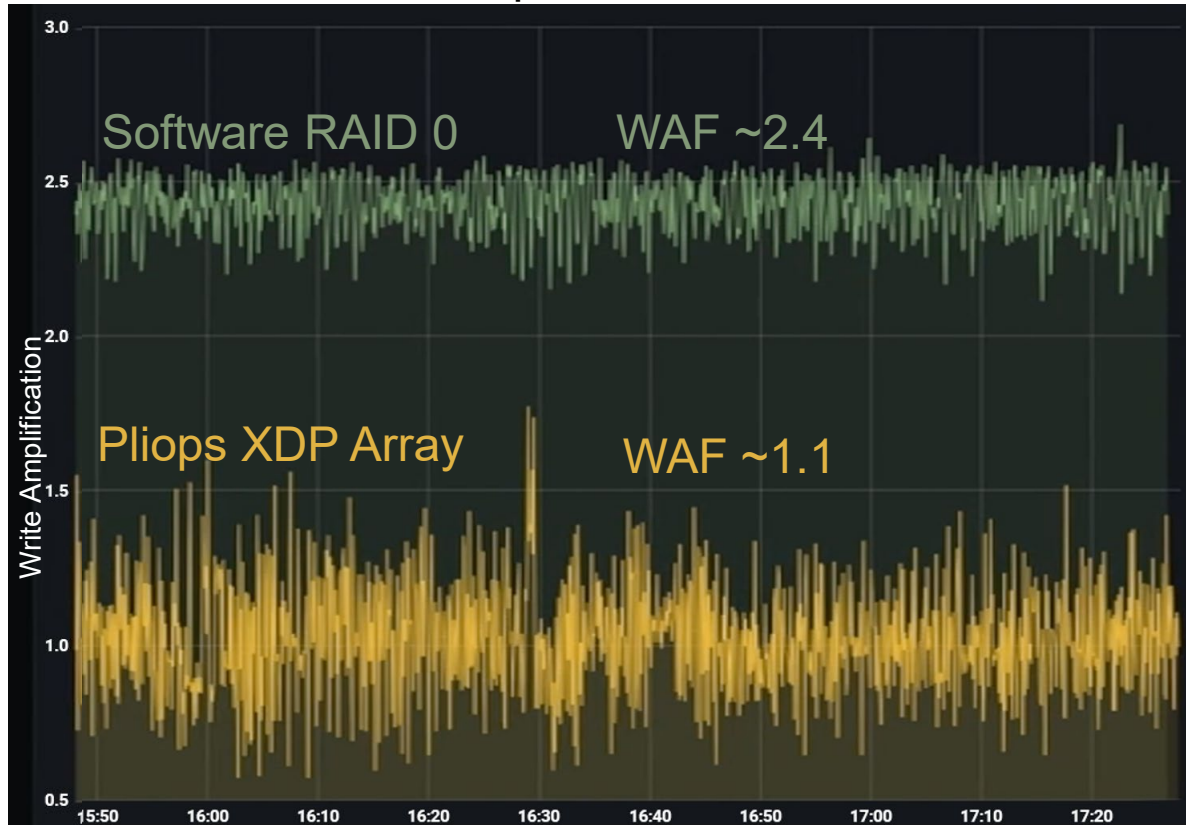
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Test Configuration:
Dell R750 with Dual Xeon 8380 and 2TB of DDR4
Four Solidigm P5316 30.72TB QLC SSDs
Software RAID 0 or XDP RAID 5
FIO: high QD with Compressible Data

Pliops XDP for Increased Drive Life

Real Time SSD Write Amplification for a Random Write Workload



Data Compression * Lower WAF =
Lower NAND PE Cycles

Up to 7X Extended Drive Life

Test Configuration:

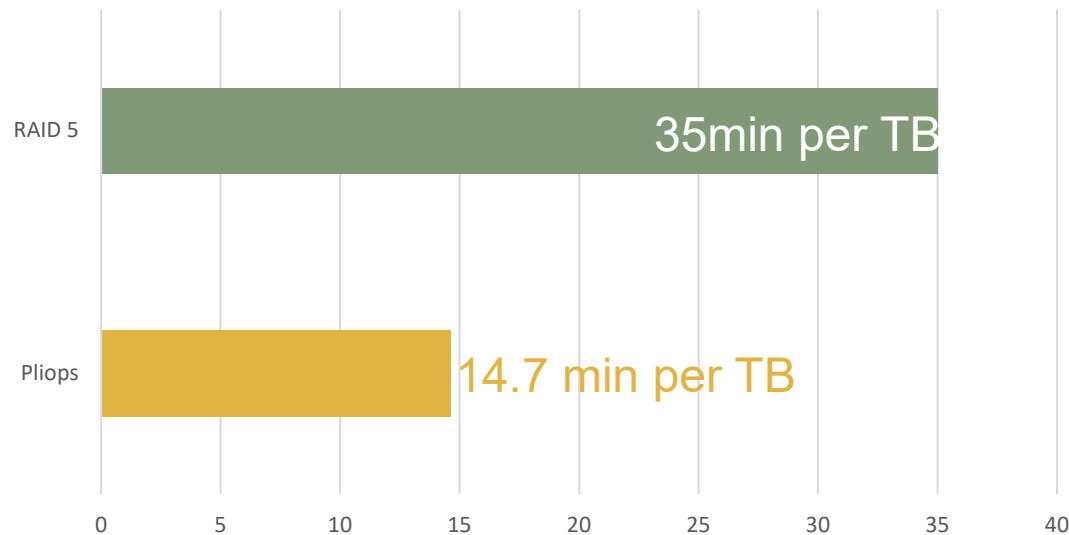
4 Drive Array of Solidigm P5316

FIO: random write 16k bs QD 128

Measuring NAND and Host Writes via SMART

Pliops XDP for Increased Data Resiliency

Data Rebuild Rate



- Configurable to protect against two drive failures
- Performance higher than Software RAID even while rebuilding
- Rebuild without consuming CPU cycles

**Rebuild the Solidgm 30TB P5316
in just 7.5 hours.**

Test Configuration

8 Drive Array of Solidgm P5316

FIO: 70/30 Mix workload with QD 32

Tier One CSP EBS Application of QLC + XDP

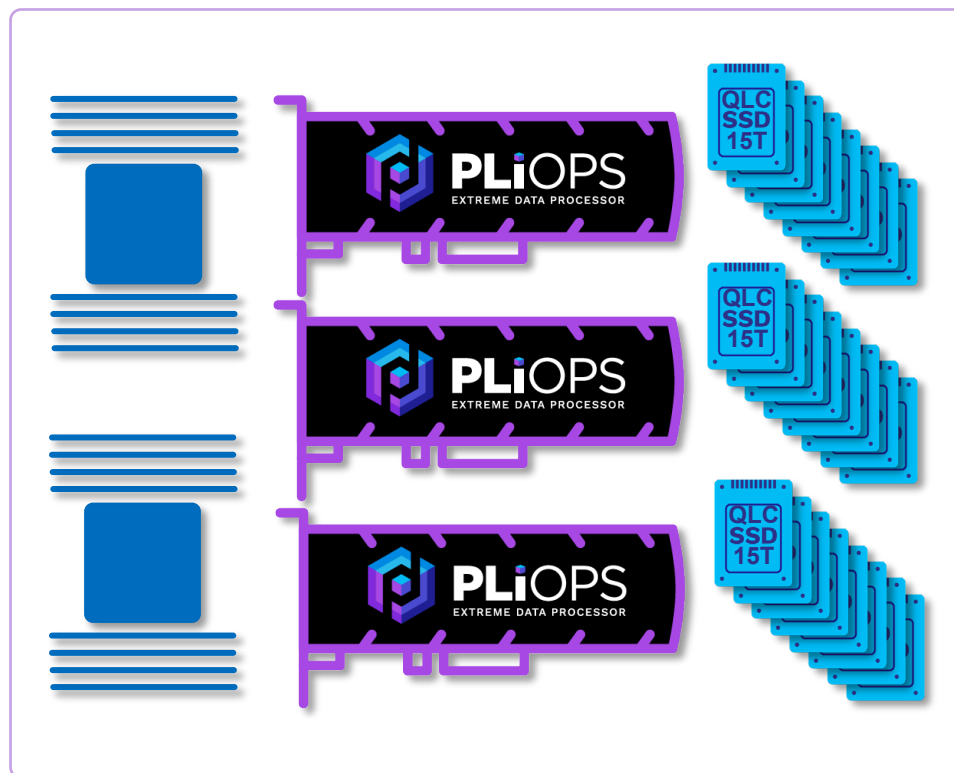
Previous Configuration

~150TB of Usable Capacity



Solidigm + Pliops Enabled Configuration

~430TB of Usable Capacity per Server



Capacity	↑ ~3x
Reliability	↑ 100%
System Cost/GB	↓ 40%
Endurance	↑ 1.5x