SOLUTION BRIEF

Enhanced Ceph Node & Cluster Reliability with Cost-Effective Performance Density

Best-in-class Ceph Reliability, Performance, and Scalability: Pliops Extreme Data Processor and Solidigm D5-P5316 QLC 15.36 TB NVMe SSDs

Solution Highlights

With surging growth in Ceph data volumes and the rising infrastructure costs, the need for accelerated performance and enhanced data infrastructure reliability for Ceph nodes and clusters has never been more critical.

High-capacity QLC SSDs from Solidigm combined with Pliops XDP delivers greater reliability, performance, scalability, and data protection at a lower cost/TB.

This solution provides a cost-effective approach to adding scale, reliability, density and performance for your Ceph deployments using all-NVMe QLC SSDs.

Unlock and efficiently scale the value of Ceph data with Pliops and Solidigm

Solidigm | Pliops Solution

Figure 1. Solidigm D5-P5316 15.36 TB NVMe SSD & Pliops Extreme Data Processor (XDP)

Pliops Drive Failure Protection (DFP)

Critical to node and cluster reliability is the risk of drive failures and the ability and time required to recover and rebuild it. Pliops DFP offers full performance RAID 5/6 style reliability and ultra-fast drive rebuilds without the tradeoffs of traditional solutions. XDP dramatically reduces overhead to speed the rebuild. Testing shows SSD rebuild time with XDP was 2.2x faster than without XDP, at under 20 minutes/TB - and with minimal impact to performance. XDP can rebuild two drives in the time otherwise needed to rebuild a single drive, a key productivity benefit.

Key Solution Benefits

- Pliops XDP delivers exceptional Ceph reliability, density, performance and efficiency gains with significant cost savings –for lower overall cost/TB
- Dramatically increase system reliability with integrated node-level RAID 5/6-style data protection and ultra-fast SSD rebuilds
- Extend QLC SSD endurance and useful life by 4.4x , while reducing replacement costs by 50%.
- Greater density with larger capacity SSDs that can also deploy with full SSD data fill without performance penalty
- Pliops XDP is simple to deploy and easy to use - works in any server.

Enhancing Ceph Infrastructure

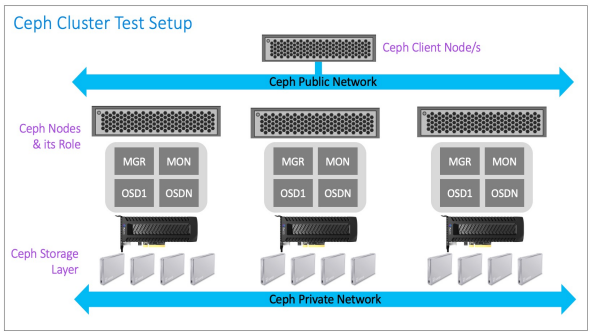
- High-capacity QLC SSDs for greater Ceph data storage density
- Enhanced node & cluster reliability
- Accelerated Ceph performance across block sizes
- Eliminate blast radius anxiety with no compromise RAID 5/6 style protection
- Ultra-fast SSD rebuilds – under **20 minutes/TB** which is **2.2x faster** compared to software only
- Reduction of **write amplication to 1.02** – extending SSD endurance for dramatically longer useful drive life by **4.4x** while also reducing need for replacement and costs by **50%.**

Higher Endurance and Performance

XDP and Solidigm QLC SSDs testing show enhanced endurance up to **7x** for longer drive life by transforming all random writes into sequential writes, dramatically reducing write amplification to **1.02.** Testing also shows performance acceleration up to **2x** for a 4K 70/30 workload as well as for 4K random writes.

Solution Testing

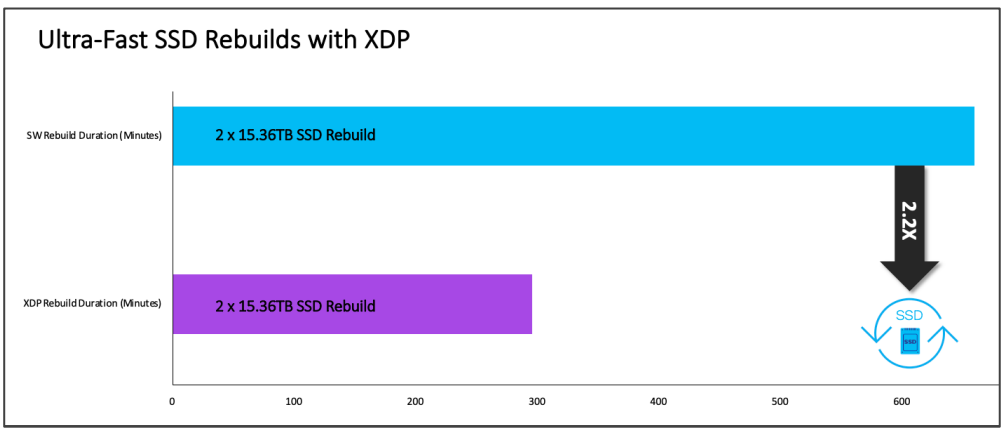
Solution testing was accomplished with four Intel® Server Systems each configured with 3 x Gold 6330 CPUs and 1 Platinum 8352S CPU, 256GB for memory, four Solidigm D5-P5316 QLC 15.36 TB NVMe SSDs, and a single Pliops XDP card. For networking, a 25Gb NIC was used on the client and a 100Gb NIC used on the server.



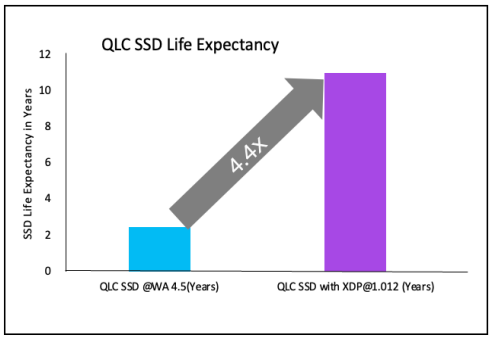
For software, Ceph v15 and Ceph OSD backend, set to replication mode of 3. The testing compared the Ceph cluster configured with Pliops XDP and then configured without XDP. With a focus on data performance measuring Read and Write bandwidth (MB/s) for a range of block sizes (KB), testing also included performance measurement during a single drive failure and drive rebuild, as during a single drive failure and drive rebuild, as well as drive rebuild time. Testing also measured write amplication across a range of block sizes. A Linux® FIO benchmark tool was used for the test measurement.

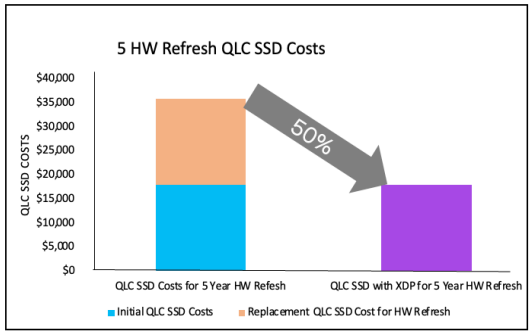
Test Results

There are multiple benefits by adding a single Pliops XDP to a Ceph node. This includes Ceph data infrastructure made more reliable and SSDs benefiting from extended endurance for longer useful life. This is in addition to accelerating performance by 2x while also reducing latency by 2.5x and providing much-needed redundancy and data protection. The following graphs highlight key results.

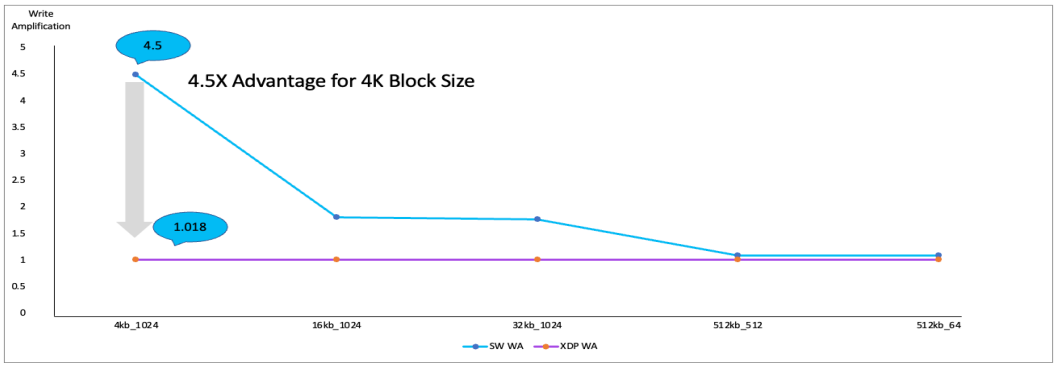


SSD Endurance & Cost Savings Benefit with XDP

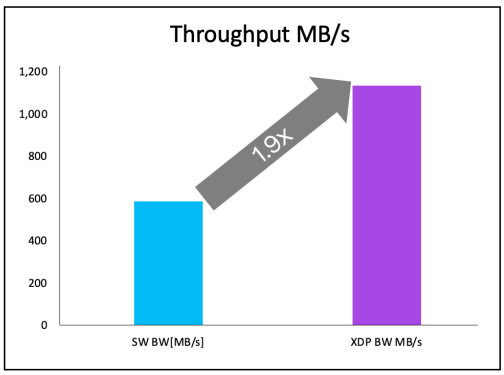


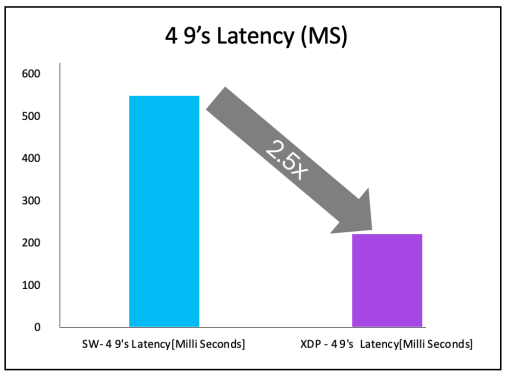


Write Amplification Benefits with Pliops XDP



70 / 30 Mixed Workload: Performance & Latency





About Pliops

Pliops multiplies the effectiveness of organizations' infrastructure investments by exponentially increasing datacenter performance, reliability, capacity, and efficiency. Founded in 2017 and named as one of the 10 hottest semiconductor startups by CRN in 2020 and 2021. Pliops global investors include NVIDIA, Intel Capital, SoftBank, Western Digital, KDT, and Xilinx. **Learn more at www.pliops.com.**