

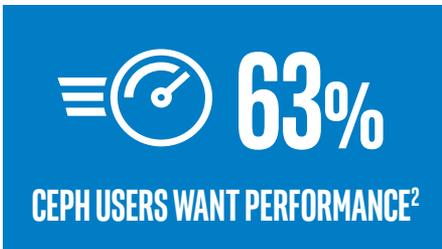
BUSINESS BRIEF

Data Center
Software-defined Storage



Speed Up Ceph* Clusters for Increased Performance with Intel® Optane™ Technology

Adding Intel® Optane™ DC SSDs for the metadata tier can boost performance of Ceph* clusters



Industry Strategic Challenges

Ceph* is an open, scalable storage solution, designed for today's demanding workloads like cloud infrastructure, data analytics, media repositories, and backup and restore systems. It's used by enterprises, government agencies, and cloud-based customers for a range of use cases, including video surveillance, media synchronization and video sharing, collaboration and file sharing, modern databases, content delivery networks (CDNs) and web hosting—all of which demand high performance and low latency. It is now deployed for block storage by the majority of OpenStack* users, with four times the deployments as the next most popular solution.¹ Among Ceph users, 63 percent have identified performance as a top need going forward.²

Intel® Optane™ DC SSDs are an accelerator for Ceph clusters that can be used with SSD-based clusters for low latency, high write endurance, and lower cost performance.³ Adding them to the Ceph metadata tier is a cost-effective solution to meet growing performance needs, while containing or even reducing costs.

Intel Optane technology is a unique combination of building blocks. It is built around Intel® Optane™ memory media, a new type of media that is non-volatile but not NAND. The media is combined with Interconnect IP software and media and storage controllers for an SSD with unparalleled performance. In fact, when Ceph clusters are built with high performance devices like Intel Optane DC SSDs, system performance is no longer limited by the storage devices.

Business Drivers and Desired Outcomes

This solution allows businesses to target specific enterprise priorities

PRIORITY	HOW INTEL® OPTANE™ DC SSDs HELP
Increase IOPS ⁴	<ul style="list-style-type: none">• Increase IOPS per node⁴• Consolidate nodes⁴• Reduce latency⁴• Reduce CapEx plus power, cooling, and rack space⁴
Maximize capacity for similar cost ³	<ul style="list-style-type: none">• Cost neutral³• Increase IOPS³• Reduce latency³

Business Value Achieved

Adding Intel Optane DC SSDs delivers:

- Lower read latency under write load compared to NAND SSDs⁵
- Higher write endurance compared to NAND SSDs⁶
- Lower cost performance³

Overall, adding Intel Optane DC SSDs enables improved performance and improved total cost over the cluster.



Accelerate Ceph and Lower Cost

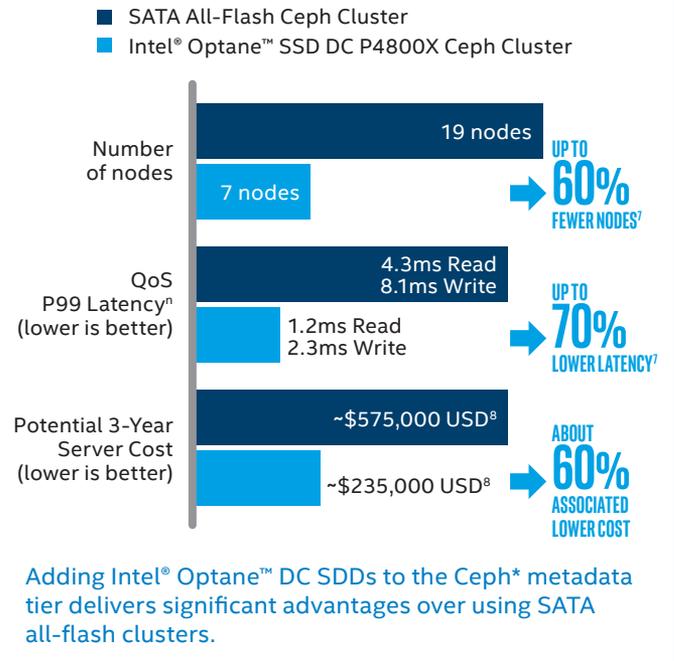
Intel Optane DC SSDs provide the most business value to Ceph when used for the metadata tier (RocksDB* and write-ahead log (WAL)), and caching of object storage daemons (OSDs).

One example compared a 19-node Ceph cluster with an all-flash SATA capacity tier. Adding a single Intel® Optane™ DC SSD P4800X for RocksDB/WAL/cache reduced the required number of nodes to seven, while reducing latency up to 70 percent.⁷ Taking into account up to 60-percent node consolidation,⁷ the new configuration has a potential three-year savings of approximately 60 percent compared to the 19-node cluster without an Intel Optane DC SSD.⁸

Enabling Transformation

Intel has been pioneering technologies to enable data center modernization—a major goal for most enterprises today. New storage solutions are a key component. Intel Optane DC SSDs enable companies to modernize at their own pace within their own budget requirements, to maximize performance of their existing infrastructure, and to reduce costs through efficiencies like consolidation. The Ceph solution in particular, offers the flexibility to focus on the challenges and opportunities most important to specific data center and user needs.

Ceph Cluster Storage Consolidation with Intel® Optane™ DC SSD vs SATA All-Flash



Where to Get More Information:

You may also find the following resources useful:

- Intel® Optane™ SSD Data Center P4800X Series
- Intel® Xeon® Scalable processors



¹ Open Stack User Survey 2018: see Deployment Decisions tab; "Which OpenStack Block Storage (Cinder) drivers are you using?" chart. <https://www.openstack.org/analytics>

² Ceph, July 2018, Slide 56, "Where Ceph Community Should Focus Its Efforts;" ceph.com/wp-content/uploads/2018/07/Ceph-User-Survey-2018-Slides.pdf

³ Reduce Costs and Optimize Performance with Intel® Optane™ Technology in Your CEPH* Cluster, Solution Overview, March 2019. <https://digitallibrary.intel.com/content/solutions/us/en/assetdetail.html/content/dam/solutions/nsg-ceph-solutions-kit-summary-march-2019.pptx>. Slide 24: Improve Performance for Similar Cost & Capacity. See Cost, Latency and IOPs claims.

⁴ Reduce Costs and Optimize Performance with Intel® Optane™ Technology in Your CEPH* Cluster, Solution Overview, March 2019. <https://digitallibrary.intel.com/content/solutions/us/en/assetdetail.html/content/dam/solutions/nsg-ceph-solutions-kit-summary-march-2019.pptx>. Slide 19: Optimize IOPS/\$ with Intel® Optane™ DC SSDs. See storage consolidation, latency and cost claims.

⁵ Reduce Costs and Optimize Performance with Intel® Optane™ Technology in Your CEPH* Cluster, Solution Overview, March 2019. <https://digitallibrary.intel.com/content/solutions/us/en/assetdetail.html/content/dam/solutions/nsg-ceph-solutions-kit-summary-march-2019.pptx>. Slide 5: What Are Intel® Optane™ SSDs? See footnote 1 for latency claims.

⁶ Intel: Endurance ratings for Intel® Optane™ SSD DC P4800X available at <https://www.intel.com/content/www/us/en/solid-state-drives/optane-ssd-dc-p4800x-brief.html> compared with Intel® SSD DC P4600 (3D NAND) available at <https://www.intel.com/content/www/us/en/products/docs/memory-storage/solid-state-drives/ssd-dc-p4600-brief.html?wapkw=p4600>

⁷ Reduce Costs and Optimize Performance with Intel® Optane™ Technology in Your CEPH* Cluster, Solution Overview, March 2019. <https://digitallibrary.intel.com/content/solutions/us/en/assetdetail.html/content/dam/solutions/nsg-ceph-solutions-kit-summary-march-2019.pptx>. Slide 19: Optimize IOPS/\$ with Intel® Optane™ DC SSDs. See storage consolidation, latency and cost claims.

⁸ Reduce Costs and Optimize Performance with Intel® Optane™ Technology in Your CEPH* Cluster, Solution Overview, March 2019. <https://digitallibrary.intel.com/content/solutions/us/en/assetdetail.html/content/dam/solutions/nsg-ceph-solutions-kit-summary-march-2019.pptx>. Slide 19: Optimize IOPS/\$ with Intel® Optane™ DC SSDs. See \$575,000 USD, footnote 2 and Appendix A for cost calculations.

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Performance results are based on testing as of July 24, 2018 and may not reflect all publicly available security updates. See configuration disclosure for details. No product or component can be absolutely secure.

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