Challenge: Effective database solutions require high-performance storage systems at low cost
A primary challenge for effective database management systems is to optimize application performance. Many companies sacrifice performance by utilizing economical SATA-based media such as HDDs and SATA SSDs for database applications. For high-speed use-cases, companies opt to upgrade to all NVMe* drives, increasing overall system costs. In order to optimize database performance, Intel offers a unique solution utilizing Intel® D3-S4510 SSDs, an Intel® Optane™ SSD, and Intel® Cache Acceleration Software (Intel® CAS) as a performance-based, economical alternative to traditional forms of storage deployment.

Solution: An Intel® SSD D3-S4510 paired with a high-speed Intel® Optane™ SSD delivers up to 3.1x the TPS at 32% the latency of an Intel SSD D3-S4510 baseline configuration
By caching an Intel SSD D3-S4510 with an Intel Optane SSD, it is shown that MySQL database performance yields 3.1x the Transactions Per Second (TPS) and 32% the average latency of a baseline configuration using a single Intel SSD D3-S4510 without a cache. This reference solution enables MySQL database deployment at economic cost and higher performance with Intel® Optane™ technology.

Unleash the power of Intel® Optane™ technology and Intel® Cache Acceleration Software (Intel® CAS) to boost a SATA SSD baseline by 3.1x TPS and 32% average latency.
Conclusion

By unleashing the power of Intel Optane technology along with the caching abilities of Intel CAS, datacenters can improve MySQL database performance and decrease latency by over 3 times compared to traditional forms of storage.

For more information about solutions with Intel® CAS, visit: http://www.intel.com/cas

Figure 1: Transactions Per Second (TPS) and Average Latency for Intel® SSD D3-S4510 Baseline vs. D3-S4510/Intel® Optane™ SSD/Intel® CAS

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<thead>
<tr>
<th>Transactions Per Second (TPS) (Higher is Better)</th>
<th>Average Latency (Lower is Better)</th>
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<tbody>
<tr>
<td><img src="image" alt="Graph showing TPS comparison between Intel SSD D3-S4510 Only and Intel SSD D3-S4510 + Intel Optane™ + Intel® CAS" /></td>
<td><img src="image" alt="Graph showing Average Latency comparison between Intel SSD D3-S4510 Only and Intel SSD D3-S4510 + Intel Optane™ + Intel® CAS" /></td>
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1. Source: Intel Tested. System configuration/Test Details: Server model: Intel® Wolf Pass S2600WFT (R2208WFTZS); MB: H48104-710; CPU: Dual Intel® Xeon® Gold 6154 CPU @ 3.00GHz, 18C/36T, 10.4GT/s, 24.75 MB L3 Cache, Turbo, HT (150W); Mem: 24x16GB RDIMM (384GB), 2133MT/s; NICs: Embedded Intel® X722 10GbE LAN, BIOS Version: SE 5C620.868.00.01.0014.070920180512; OS Version: CentOS 7.5; Kernel Version: 3.10.0-862.11.6.el7.x86_64; S4510 Baseline Config: 1x Intel® SSD DC S4510 960GB; S4510/ Intel® Optane™ P4800X/Intel® CAS config: 1x Intel® SSD DC S4510 960GB and 1x Intel® Optane SSD DC P4800X for caching; Workload: Sysbench 1.0.16 using MySQL 8.0.12 as database, size=100G, test block size 16kb, time-based one-hour oltp read-write conditioning (block size 128kb), time-based 20-min test, Pareto random distribution (pareto-h constant = 0.8, meaning 80/20 distribution). S4510 baseline system obtained 639 TPS and 50.07 ms latency on average. S4510/Intel® Optane™ P4800X/Intel® CAS system obtained 1953 TPS and 16.39 ms on average

Performance results are based on testing as of February 19, 2019 and may not reflect the publicly available security updates. See configuration disclosure for details. No product can be absolutely secure.

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