BUSINESS BRIEF

Software-defined Storage
Intel® Optane™ SSDs

Do More Today and Scale Tomorrow—For Less

Intel® Optane™ DC SSDs deliver increased performance, reduced latency, and lower costs with Microsoft Storage Spaces Direct*

Microsoft Storage Spaces Direct* powered by Intel® Xeon® Scalable processors and using Intel® Optane™ DC SSDs as the cache tier delivers the following:

- **Lower latency –** IO is not dependent on CPU, freeing the CPU for workload processing
- **Higher throughput –** Achieved up to 45 percent higher IOPS on mixed workloads over 3D NAND[5]
- **Lower costs per transaction –** With greater cache efficiency and drive endurance, cost per transaction is reduced significantly[6]

Industry Strategic Challenges

In an increasingly data-driven world, organizations need access to more data, faster every day. The ability to mine data for critical information and better decision making can be the difference between competitive advantage and lost market share. With so much data being collected, storage is a key factor in speed to insight. But many companies are making do with older, slower hard drives because the alternative is perceived to be too expensive. What's needed is a lower-cost solution that delivers higher performance for current needs with scalability for data growth in the future. Microsoft Storage Space Direct* (Microsoft S2D*) is a highly scalable hyperconverged infrastructure (HCI) solution designed to help companies modernize their data center infrastructure. The rate of Microsoft S2D adoption is growing rapidly—roughly 50 percent in the first half of 2018 alone.[1] And the CAGR forecast for the hyperconverged segment of the software-defined storage market is 32.9 percent for the period from 2018 to 2023.[2] Aligning with both these trends will support the high-density data mining today's companies need to gain timely, actionable business intelligence.

The solution? Powering MS S2D with Intel® Xeon® Scalable processors and using Intel® Optane™ DC SSDs as the cache tier can increase throughput up to 45 percent with the same amount of memory, allowing companies to achieve higher performance per dollar.[3,4]

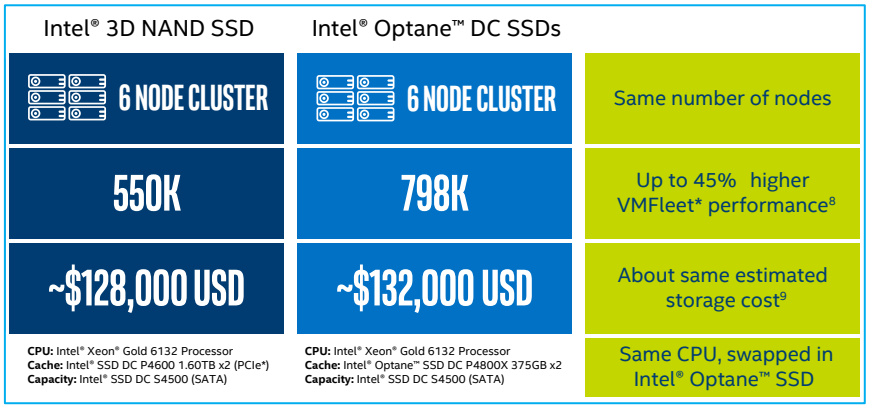
Business Drivers and Desired Outcomes

- Get a better, faster return on data mining investment
- Get actionable insight at the speed of business
- Increase storage capacity cost-effectively
- Modernize the data center to benefit from the latest technologies

Digital Transformation and Business Innovation

To keep up with today's massive data volumes, companies must ensure high availability. Intel Optane DC SSDs allow them to do this without having to choose between performance and cost. This approach boosts performance to avoid storage bottlenecks, do more per server, and reduce the cost of latency-sensitive workloads.[7] It focuses on one of the key areas of hyperconvergence—storage—and helps companies along the path to modernization.

Data Storage Deployments with Intel® Optane™ DC SSDs and Microsoft Storage Spaces Direct*



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.

Where to Get More Information:

- Intel® Optane™ Technology
- Intel® Xeon® Scalable Processors
- The Age of Data Center Convergence Gives Storage a Boost
- Do More, Spend Less: Faster Insights Equals Shorter Time-to-Market

Customer Evidence

National law firm Bradley Arant Boult Cummings needed to update its primary data center. Their goals included moving to HCI, laying the foundation to use hybrid cloud, improve performance, reduce latency, and reduce the overall maintenance and licensing costs. They selected Microsoft DataON S2D HCI, optimized for IOPS and performance, and an all-flash solution with NVMe*-based Intel Optane SSDs. The solution increased performance with near-instantaneous reboot times and much lower latency.[10] Bradley also significantly reduced maintenance costs and decreased annual licensing fees.

[1] Adoption rate +50% for 6 month period from March to October 2018. https://techcommunity.microsoft.com/t5/Storage-at-Microsoft/Hyper-converged-infrastructure-in-Windows-Server-2019-8211-the/ba-p/428280

[2] Hyper-Converged Infrastructure Market worth $17.1 billion by 2023, MarketsandMarkets press release, January 8, 2019. https://markets.businessinsider.com/news/stocks/hyper-converged-infrastructure-market-worth-17-1-billion-by-2023-exclusive-report-by-marketsandmarkets-1027852261

[3] Claim: 45% Higher IOPs; Lower latency with same CPU. Performance results are based on testing as of June 30, 2018 and may not reflect all publicly available security updates. Source – Dataon, Inc. - System Configuration – Intel® DC SSD P4600 1.6TB - 2x, Intel® DC S4500 3.8TB x22, Intel ® Xeon ® Scalable Processor Gold 6132, 2.60Ghz, 28 cores, 56 logical processors. 768 GB DDR4, IOPs = 548K, latency = R-0.25ms / W 0.15ms; Intel® Optane™ DC SSD P4800 375GB - 2x, Intel® DC S4500 3.8TB x22, Intel ® Xeon ® Scalable Processor Gold 6132, 2.60Ghz, 28 cores, 56 logical processors. 768 GB DDR4, IOPS = 798K, latency = R- 0.192ms W - 0.21ms; Mixed workload 70%R/30%W - VMFLEET (20 VM's per node) Six nodes; test profile - Random- 4K, 8 Threads, 1 outstanding IO (70%Read/30%Write)

[4] Claim: Lower overall cost or higher performance without increasing cost. Based on performance test as detailed in endnote 3. Source for Pricing (as of April 2019): S4500 3.84TB – US$ 890.00 per drive *6*22*890 = 117480 - https://www.amazon.com/Intel-S4500-Internal-Solid-State/dp/B075HRYWC4; P4600 1.6TB – US$ 861.64 per drive *6*2 = 10339.68 - https://www.newegg.com/Product/Product.aspx?Item=1B4-008A-000W2; P4800X 375GB – US$ 1172.92 per drive*6*2 = 14075.04 - https://www.newegg.com/Product/Product.aspx?Item=9SIA1K68TS2216&Description=p4800x&cm_re=p4800x-_-9SIA1K68TS2216-_-Product. Storage Configuration 1 – 6 nodes , each node with 2xP4600 1.6TB + 22xS4500 3.84TB = Total cost is US$ 127819.68. Storage Configuration 2 - 6 nodes , each node with 2xP4800X375GB+ 22xS4500 3.84TB = Total cost is US$ 131555.04.

[5] See endnote 3

[6] See endnotes 3 and 4

[7] See endnotes 3 and 4

[8] See endnote 3

[9] See endnote 4

[10] Source - http://www.dataonstorage.com/customer-stories/law-firm-looks-to-the-future-with-a-microsoft-hci/

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