CASE STUDY

Intel® Optane™ SSD DC P4800X Series
Cloud Computing, Data Center Optimization
Communication/Media

Intel® Optane™ SSD DC P4800X and VMware vSAN* deliver an inexpensive, high-performance private cloud

Intel® Optane™ SSD DC P4800X Series speeds up SDS cache tiers

IDC Frontier Inc.

Kioi Tower,Tokyo Garden Terrace Kioicho, 1-3 Kioicho, Chiyoda-ku, Tokyo, Japan

Established: February 2, 2009

Capital: 100 million yen

Business Activities: Cloud and data center businesses

https://www.idcf.jp/english

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Challenge

- To resolve insufficient disk space and poor performance: IDC Frontier needed to future-proof its storage system to expand its IDCF Cloud service.

Solution

- A private cloud combining Intel® Optane™ SSD DC P4800X and VMware vSAN*: The company developed an easily scalable software-defined storage (SDS) platform requiring less management time.

Results

- Improved performance: IOPS is about 1.3 times faster than all-flash storage and 4 times faster than hard-disk storage in 4 KB random writes.
- Reduced costs: Cost per IOPS is 1/8th that of all-flash storage and 1/14th that of hard disk storage in 4 KB random writes.

Confronting the performance challenges of hard disk-based tiered storage

IDC Frontier offers cloud and data center services as an innovative partner providing foundations for the future. The company has been leading the corporate data center and cloud businesses of the SoftBank Group since joining the conglomerate in May 2018, expanding its service lineup and streamlining operations.

To solve disk capacity and performance issues in its platform for managing the IDCF Cloud, an IaaS public cloud that the company provides, IDC Frontier developed a private cloud for its own use by combining the Intel® Optane™ SSD DC P4800X series and VMware vSAN*. The management platform for the IDCF Cloud service used hard disk-based tiered storage, which reflected the design philosophy of 2014—the year when provision began. The company worried that this last-generation architecture would create performance and operating problems when expanding its services in the future and began considering solutions.

IDC Frontier had accumulated a wealth of knowledge about operating VMware vSAN* as it had been providing IDCF Private Cloud, a private cloud using an all-flash VMware vSAN*, to corporate customers since September 2016. The company had also refreshed its bare-metal server lineup in November 2018, offering high-speed equipment featuring the Intel® Optane™ SSD DC P4800X series. With these factors in mind, the organization started a plan to develop a private cloud combining Intel® Optane™ SSD DC P4800X and VMware vSAN* as the management platform for IDCF Cloud.

Ultra-low latency and 60 DWPD high endurance with Intel® Optane™ SSD DC P4800X series

Although IDC Frontier initially looked at an all-flash array, performance and cost considerations drove the company to a combination of Intel® Optane™ SSD DC P4800X for cache memory and high-capacity SSD for data storage. Takashi Kanai, Director of Cloud Infrastructure Department in the Cloud Division, explains the reason for adopting Intel® Optane™ SSD DC P4800X as follows.

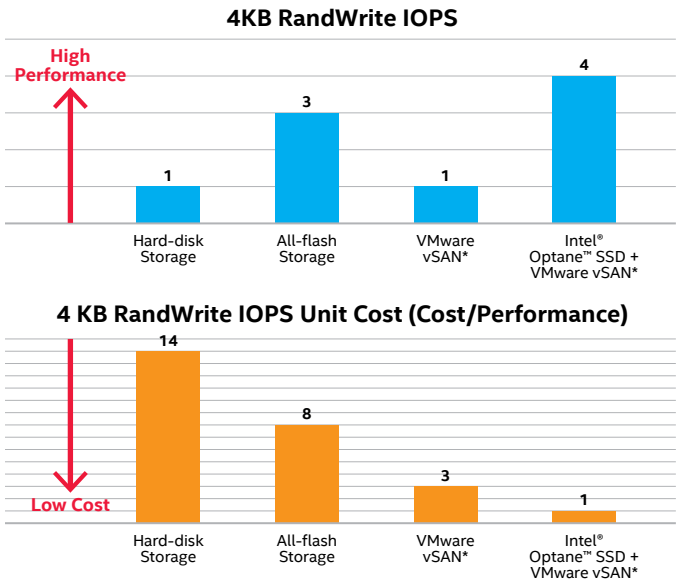
"The reasons for our selection were the low latency and consistent performance in random reads/writes. Using the solution on bare-metal servers had a particularly significant effect on database response times, which improved application performance. In addition, the SSD DC P4800X series is up to 20 times more durable than conventional NAND and requires less cache capacity. A private cloud developed with VMware VSAN* requires a cache-to-capacity ratio of as much as 1:10 with traditional SSDs, but the Intel® Optane™ SSD DC P4800X series enables a 1:30 ratio. Basically, you can allocate multiple high-capacity SSDs to one cache, which provides huge cost savings."

While there were no examples of using VMware vSAN* with Intel® Optane™ SSD DC P4800X in Japan at the time of planning, international examples of use in airline systems and other mission-critical situations gave IDC Frontier confidence. "Intel provided many case studies and success reports, including performance verifications, which enabled us to introduce the solution without any worries," recalls Kanai.

Reduced virtual machine provisioning times and improved work efficiency

The management platform of the VMware vSAN* IDCF cloud consists of eight servers equipped with Intel® Xeon® Scalable processors (Intel® Xeon® Gold processors)—the new generation of Intel server processors. Eight servers are each equipped with a 375 GB Intel® Optane™ SSD DC P4800X for cache memory and five 1.92 TB SSDs for storage. "For the configuration, we examined the standard models published by VMware as a reference and decided the specifications by balancing cost and performance," explains Tsuneyoshi Mogami, also from the Cloud Infrastructure Department.

IDC Frontier has verified the following impressive results. For IOPS, the solution performs random writes of a 4 KB IO size about 1.3 times faster than all-flash storage and 4 times faster than hard-disk storage. Random reads are 15 times faster than with hard-disk storage.



In terms of cost per IOPS, the new system performs random writes of a 4 KB IO size at 1/8th the cost of all-flash storage and 1/14th that of hard-disk storage. For random reads, it is 1/48th of the cost of hard-disk storage.

"While the solution was always going to be much better than hard-disk storage in terms of performance and cost effectiveness, the results of comparing it to an all-flash array exceeded our expectations. We are very satisfied," says Mogami.

There have also been improvements in administrative aspects, with much faster virtual machine provisioning and shorter release periods. According to Ryusuke Matsuyama of the Cloud Infrastructure Department, "Our developers ask for more virtual machines every time we release a new service. This took quite a long time in our previous hard-disk storage environment, but they barely have to wait with the Intel® Optane™ SSD DC P4800X environment, which gives them room to relax. As a result, the work efficiency of our administrators has increased and their workload has been reduced."

Offering VMware vSAN* to external users

IDC Frontier believes that the high-capacity and high-performance storage delivered by Intel® Optane™ SSD DC P4800X and VMware vSAN* makes the combination an effective solution for corporate IT infrastructure. To share the benefits, the company plans to offer it to external users as a cloud service.

For more information about the Intel® Optane™ SSD DC P4800X Series, visit **https://www.intel.com/content/www/us/en/products/memory-storage/solid-state-drives/data-center-ssds/optane-dc-ssd-series/optane-dc-p4800x-series.html**