Improving Virtual Desktop Infrastructure Performance with Intel® Solid-State Drives

Shandong University of Science and Technology utilizes the EVENDATA eCLOUD cloud computing solution, integrated with Intel® Solid-State Drive DC S3500 Series, improving the storage performance of its data center while reducing total cost of ownership.

Challenges
- **Shorten boot time of virtual desktops.** Improve user experience by reducing the time it takes for virtual desktops to start, especially when most desktops are started simultaneously.
- **Boost data center storage performance.** Enhance data access performance of the data center’s storage system, and eliminate delays in running virtual desktop applications with frequent read/write operations.
- **Better storage utilization.** Available storage capacity in the existing infrastructure could not be fully utilized, which drove up hardware and maintenance costs.

Solution
- **Deploy the EVENDATA eCLOUD solution integrated with Intel® Solid-State Drive DC S3500 Series.** Adopt a cloud VMware-based cloud solution to improve storage utilization and utilize Intel SSD DC S3500 Series to improve system performance and remove the read/write bottleneck.

Impact
- **Improved user experience.** Previously 45 seconds, start time for the virtual desktops is now 20 seconds, reducing boot time by over 50 percent.
- **Improve storage utilization.** SDUST cut down on the number of drives being used to store data by over 50 percent, while meeting data center I/O performance requirements.

SDUST used to adopt a traditional virtual machine deployment solution in its data center, maintaining several virtual desktops on mutually independent physical servers. Explains Cui Ran, Network Center director at SDUST, “Under this architecture, as the storage of data keeps growing and producing new storage needs, the university has to update all existing servers. We needed to purchase hard disks with higher capacity for replacement and expansion even if there is still storage space left in some servers due to the mutual independence of each server. The costs of the hardware itself and of system maintenance were very high.”

SDUST was also dealing with the problem of slow boot time for virtual desktops, especially when a large number of users boot the virtual machines concurrently. At present, it takes more than 45 seconds to boot a single virtual desktop. However, technicians in the university noticed that the usage rates of the server processors and network were not that high, which means the servers still had enough computing capacity to support more virtual desktops. They found out that the slow boot time of the virtual desktops was due to the read/write bottleneck with the traditional mechanical hard disks. Software performance also suffered. Advanced users such as those using software development tools were impacted more severely. The poor performance of the virtual desktops had seriously affected the teaching efficiency and learning experience.

Aiming to address these challenges, SDUST needed a new solution that will deal with storage performance, storage expansion, and the daily boot storm.

SDUST chose the EVENDATA eCLOUD solution to address its virtual desktop infrastructure (VDI) challenges, after comparing several solutions. The EVENDATA eCLOUD solution improved user experience by reducing the time it takes for virtual desktops to start, especially when most desktops are started simultaneously. It also boosted data center storage performance by enhancing data access performance of the data center’s storage system. Additionally, it improved storage utilization by ensuring that available storage capacity in the existing infrastructure was fully utilized, reducing hardware and maintenance costs. SDUST previously experienced slow boot times of over 45 seconds for virtual desktops, but with the EVENDATA eCLOUD solution, this time was reduced to 20 seconds, a reduction of over 50 percent. As a result, SDUST was able to cut down on the number of drives being used to store data by over 50 percent, while meeting data center I/O performance requirements.

Cui Ran, Network Center Director, SDUST
Deploying the EVENDATA eCLOUD* solution integrated with Intel® SSD DC S3500 Series helps SDUST significantly improve virtual desktop performance

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All performance tests were performed and are being reported by Shandong University of Science and Technology. Please contact Shandong University of Science and Technology for more information on any performance test reported here.

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Reducing Boot Time While Improving Data Read/Write Performance

SDUST also took a tiered approach to its data storage. To enhance virtual desktop performance and reduce boot time, operating systems and frequently accessed data were stored on the Intel SSD in the eCLOUD solution. Infrequently accessed data were stored in traditional hard drives to reduce total storage cost.

During the test, 400 virtual desktops were able to start efficiently in just 13 minutes, or at least 30 virtual machines every minute. "When using traditional mechanical hard disks, the starting time usually took over 30 minutes, which means only 13 virtual desktops can be started every minute. With the new solution, boot time was only 20 seconds for each virtual machine, a reduction of more than 50 percent" notes Ran.

Intel SSD not only reduces boot time but also improves software performance. "For example, when visiting the website in our campus forum, email system, and deep analysis of network flow, more advanced Intel SSD solutions into other applications.

Enhancing Overall Data Center Performance

Deploying the eCLOUD solution integrated with Intel SSD DC S3500 Series also allowed more virtual machines in the data center to be deployed on each physical server, which not only boosted I/O performance but also provided more virtual desktop services to users.

In the future, SDUST and EVENDATA aim to optimize the new solution by cooperating with Intel to further improve the use ratio and performance of Intel SSD by applying technologies such as automated tiered storage, and deploying more advanced Intel SSD solutions into other applications.

Find a solution that's right for your organization. Contact your Intel representative, visit Intel's Business Success Stories for IT Managers (www.intel.com/itcasestudies) or explore the Intel.com IT Center (www.intel.com/itcenter).

LESSONS LEARNED

• High-performance Intel® SSD DC S3500 Series removes the I/O bottleneck of traditional hard drives, and resolves the virtual desktop infrastructure (VDI) performance issues faced by Shandong University of Science and Technology (SDUST) during boot storms and regular use.

• By adapting a cloud-based VDI solution provided by the EVENDATA eCLOUD* solution, SDUST was able to make effective usage of available storage capacity compared to the previous approach of using shared physical servers.

• A tiered data storage approach that stores frequently accessed data on Intel SSD DC S3500 and infrequently accessed data on traditional hard drives optimizes the balance between performance and cost.