CASE STUDY
Intel® Solid-State Drives
Cloud Computing

Enhanced content distribution network with Intel® Solid-State Drives

Beijing Fastweb Technology Co. Ltd. improves its content distribution network's node data output capacity by more than four times with Intel Solid-State Drive (Intel® SSD) 320 series

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"Intel® SSD 320 series, with its excellent data reading performance and better cost/performance ratio, has optimized our CloudCDN system's CDN node data output capacity, improving its performance by more than four times over the previous configuration."

Sun Baijie
Product Manager
Beijing Fastweb Technology Co. Ltd.

Founded in 2006, Beijing Fastweb Technology Co. Ltd. (Fastweb) is China's leading technology-oriented professional content distribution network (CDN) service provider. More than 150 network nodes across all Chinese key provinces and cities, as well as several dozen network nodes across Asia-Pacific, Europe, and America, form Fastweb's CDN service system, CloudCDN*. This system continues to lead in CDN performance tests among other operators and content providers. Based on this system, Fastweb provides content distribution services to over 400 customers. To provide faster and better-quality services, the company invests in research and development, collaborates with technology providers, and utilizes new products and technologies to optimize its existing CDN system software and hardware as well as its network architecture.

CHALLENGES

- **Improve node's data output capacity.** Handle the rapidly increasing number of users by enhancing the node's data output capacity to carry more data and serve more customers.
- **Enhance data response rate.** Improve node's data read performance to make response rate faster to meet user needs.
- **Boost CDN node's stability and reliability.** Address frequent data read/write demands in the server by improving the stability and reliability of the traditional mechanical SAS hard drives.

SOLUTIONS

- **Deploy Intel SSDs.** Replacing the existing SAS hard drives with Intel SSD 320 series improves Cloud CDN system's node data output capacity.
- **Speed up data response rate.** Deploying Intel SSD 320 series boosts data read performance, even with the same server configuration.
- **Simplify mechanical structures.** Intel SSDs improved the CDN node's stability and reliability, since it has no mechanical structures, allowing it to perform faster and better.

IMPACT

- **Excellent data read performance.** Without other server configuration changes, the data output capacity was more than four times better than the traditional SAS hard drive, carrying more data and serving more customers.
- **Improved CDN node stability and reliability.** Intel SSDs have no mechanical structures, resulting in less power use.
- **High cost/performance ratio.** As tested by Fastweb, under the same budget, the solution using Intel SSD 320 series provided 3.2 times the data output capacity compared to a solution with a traditional SAS drive.

Leading the way in cloud-based content distribution network

Harnessing the power of cloud computing technology, Fastweb has independently developed CloudCDN, CloudXNS*, and CloudTCP* cloud acceleration products. To date, Fastweb has more than 3,000 servers in its CDN network nodes around the globe, crossing all major operators such as China Telecom, China Mobile, China Unicom, CERNet, CSTNet, and Great Wall Broadband.

Compared to traditional CDNs, CloudCDN takes users' different content distribution demands into consideration, distributing specific content to the network edge, closer to end users, according to special rules. This solves the problem of Internet traffic and improves the response rate of network access to data.

Fastweb uses Intel® SSDs to update its CloudCDN system's content distribution network node, improving data output capacity by more than four times

With the rapid development of cloud computing, Fastweb hopes its CloudCDN system will be able to continuously provide high-quality services for customers' deeper and more complex cloud computing applications.

Mechanical hard drives pose negative impact on CDN system

As Fastweb's business continues to grow, it gains customers in the CDN network, resulting in a data explosion. Currently, its node servers are using traditional SAS hard drives. Although these drives have enough space to accommodate growing data, Fastweb is concerned they will not be able to meet the demands of new products and technology offering content distribution services for the expanding number of users.

"Limited by the mechanical data read in the traditional hard drive, the 4*SAS drive's server has a maximum data output capacity of only 70Mbps. This causes a bottleneck in the server as more users come to use the system. To resolve this bottleneck and improve the server's data output capacity, as well as to further enhance customer service capabilities, we needed to bring in new products and technologies. While the server's adapter and processor can allow larger data output, the key to solving the bottleneck was to improve the drive's data output capacity," explains Sun Baijie, product manager at Fastweb.

Apart from problems from limited data output capacity, Fastweb also faced the challenge of meeting customer demand for higher data response rate in the CloudCDN system. As Internet end users have greater bandwidth, the rate of transmitting the same amount of data to the end users should be faster. Thus, customers expect the CloudCDN system to provide quick data response. Slow response for a network or service will cause Fastweb customers' end users to leave the system. Fastweb will have to face the risk of losing these users.

"The drive's data read performance is an important factor affecting the data response rate. However, the working principle and physical structure of the traditional mechanical hard drive determine the seeking and average latency delay when the traditional drive receives data read requests. Although software optimization can improve the data access performance to a certain degree, such improvement is still quite limited. We needed a storage device with better data read performance to meet our customers' needs and improve their experience," says Sun.

In addition, Fastweb has realized the increasingly apparent limitations of the traditional mechanical hard drive in meeting CDN needs. Since each CloudCDN server node almost bears the data read all the time, this impacts the operation of the hard drive in terms of stability, heat dissipation, and service life.

Problems in data output capacity, data response rate, and stability and reliability of the hard drive all imply potential threats for Fastweb in providing reliable content distribution service to its customers.

Improving content distribution services with solid-state drives

Late last year, Fastweb sought the help of Intel to be able to solve its issues with its current hard drive. Intel offered Fastweb the Intel SSD 320 series for testing. In the actual network, Fastweb used two servers with the same configuration to test the Intel SSD data output capacity. One SAS hard drive was used for the installation of the operating system, with three SAS hard drives and three Intel SSDs 320 series as data storage, respectively.

Test results showed that using the server with Intel SSDs can provide data output to nearly 300Mbps, more than four times what the server with the SAS hard drive delivered. Relates Sun, "When the SAS hard drive for the data storage in the node's server was replaced with the Intel SSD, the system could handle more than four times as much data while ensuring the access rate for the end users. By switching the storage medium to Intel SSDs, Fastweb can meet the growing bandwidth output demands of customers and data for the CloudCDN system."

In the actual network test, Fastweb then tested the performance of the Intel SSD 320 series in reserving different redundant space. Test results revealed that when the redundant space was 25 percent, the Intel SSD 320 series was able to meet Fastweb's demands for data read and write performance.

Moreover, since the system does not rely on mechanical equipment for seeking and reading the stored data, the 25nm Intel® NAND Flash Memory, which is based on the Intel SSD 320 series, has significantly enhanced the CloudCDN server's data response capability. The end users of Fastweb's customers could expect faster response when visiting the network, for a better experience accessing CDN services.

In addition, the high performance of the Intel SSD 320 series also met the CloudCDN system's demands for storage stability and reliability. Since it has no mechanical parts, the Intel SSD consumes less energy for less heat dissipation, thus reducing potential risks caused by heat dissipation faults.

With its advanced data protection features, the Intel SSD 320 series provides additional Intel NAND Flash Memory, which can automatically reconfigure when the controller encounters a faulty NAND array. This reduces possible data loss. Adds Sun, "This feature is important for Fastweb, since it can help us offer more reliable and stable CDN services for our customers."

Fastweb was extremely satisfied with the test results and has deployed the Intel SSD 320 series in some CloudCDN network nodes. Shares Sun, "Apart from the technology benefits, Intel SSDs also provided us with big cost savings. Our calculation demonstrated that using another SSD with the same cost provided just 3.2 times the data output capacity compared to more than four times the data output capacity provided by the Intel SSD. Fastweb has decided to give priority to purchasing Intel SSDs for node server storage and will eventually replace the existing node's SAS hard drive in the CloudCDN system."

LESSONS LEARNED

- Intel SSDs are particularly suitable for intensive data read application environments. They are the ideal choice to replace SAS hard drives for content distribution network storage, providing better cost/performance.
- With Intel SSDs, the CloudCDN system's single-node data output capacity has improved by more than four times and provided a faster data response rate, giving customers better CDN services.
- Using Intel SSDs, Fastweb has brought its CloudCDN system's stability and reliability to a new level.

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).**

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