Success story
Intel® Xeon® Processor 5500 and 5600 Series
Intel® Solid-State Drive
Performance, Storage, and the Customer Experience

Enhancing the Customer Entertainment Experience and Reducing Operating Costs for an Internet Café

Intel® Solid-State Drives help provide a high-performance storage solution for Shanghai BaBaiLong Internet Café*

China's Shanghai BaBaiLong Internet Café provides 350 diskless nodes/PCs for gaming and Internet services.

CHALLENGE

Enhance customers' entertainment experience. Improve computing responsiveness—including quicker application launch, faster file loading, and smoother game play.

Improve return on investment. Minimize conversion costs while maximizing performance and storage capabilities by enabling a single diskless server to support more client workstations.

Reduce operating cost. Reduce long-term management and maintenance costs.

SOLUTION

Migrate to a high-performance server. Install a server based on the Intel® Xeon® processor 5500 and 5600 series.

Use Solid-State drive storage. Replace original SAS storage with high-performance Intel® Solid-State Drives.

IMPACT

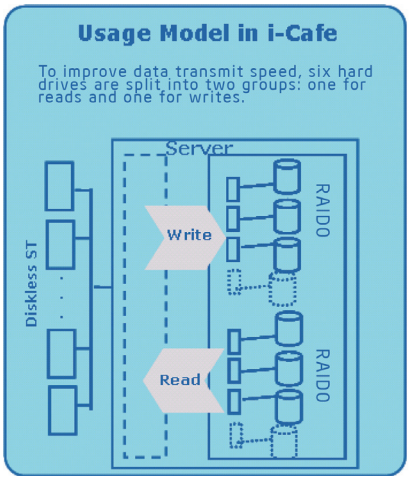
Enhanced entertainment services improve customer experience. The improved system storage solution enables Shanghai BaBaiLong Internet Café to deliver a superior entertainment experience that attracts new patrons, while providing a better entertainment experience for existing customers.

Improved performance and reliability with lower maintenance costs. Optimized diskless configuration with Intel Solid-State Drives delivers high performance and increased reliability while reducing operating costs and minimizing updating downtime.

Streamlined architecture positions Shanghai BaBaiLong for expansion. Simplified computing solution facilitates and accelerates further development and growth of the Internet café.

Previous Model: Café services bottleneck on hard disk drives (HDDs)

The Shanghai Babailong Internet Café provides entertainment services to its customers through 350 diskless nodes (PCs without disk drives).



The previous IT configuration used network booting to load its operating system and applications from a diskless server that contained seven hard disk drives, one for operating system , the others for storage—an SAS controller managed six of the drives, which are divided into two RAID 0 disk arrays (see graphic). The drives are subjected to heavy read and write loads, while the servers deliver entertainment and games to customers.

"Although the diskless configuration can support more clients with its processor and data processing capability, the actual number of clients is

"In an Internet café environment, a diskless configuration using high-performance Intel® Solid-State Drives with superior data reading and writing capability breaks the data processing bottleneck caused by mechanical hard disks. A single diskless configuration can support more clients and reduce by up to 40 percent the average cost of the diskless server for each client."

Chen Jun
General Manager
Shanghai BaBaiLong Internet Café

limited to between 60 and 80," says Chen Jun, general manager of Shanghai BaBaiLong Internet Café. "Mainly, this is due to the data throughput capability of mechanical hard disks and the need to maintain customers' entertainment experience. Plus, the number of clients supported by a single server is usually the determining factor of an Internet café's operating costs and expansion plans.

"The implication is that storage systems based on traditional hard disk drives can significantly impede the development of Internet cafés. Today's games have very quickly advanced to deliver realistic special effects that demand higher performance from the server. Because of the inherent data throughput limitations of mechanical hard disks, the reliability and data processing ability of SAS hard disk drives—even when used as RAID 0 disk arrays—cannot meet current data demands. Rapidly increasing data access makes the hard disk generate more heat; which, together with frequent data reading and writing, shortens the lifespan of the hard disk. This eventually results in additional management resources and increased maintenance workloads for the diskless server. This doesn't just affect the game loading speed on the client PCs; it can also force customers to experience a sudden slowdown in PC operation or even downtime, especially during peak business hours. For an Internet café, a customer's poor entertainment experience may lead to a direct loss of patrons."

Solutions Model: Replace traditional hard drives with Intel Solid-State Drives

As the Internet and the Internet café market segment matures, delivering a superior customer entertainment experience—location, décor, ambiance, and services—helps to differentiate one establishment from another. Lowering operating costs is also an important factor for Internet cafés to succeed in an increasingly competitive market segment.

To retain and attract more customers, the Shanghai BaBaiLong Internet Café sought to improve its customers' entertainment experience by enhancing performance while reducing operating costs.

Chen Jun says, "While adding new servers to share the existing server data I/O load would no doubt solve the problem, it would also significantly increase operating costs. The costs would not only involve purchasing new servers, but also multiply the cost of management and maintenance resources, as well as cooling and power."

After consulting both system integrators and Intel, Shanghai BaBaiLong Internet Café made the decision to deploy a new diskless server solution using high-performance Intel Solid-State Drives.

Deploying a diskless server solution based on Intel Solid-State Drives

The new solution combines high-performance Intel Solid-State Drives with a server based on the Intel Xeon processor 5500 and 5600 series. The data reading component of the solution uses one 80 GB Intel® X25-M SATA Solid-State Drive to store the operating system for client startup and current popular games. The solution also uses a second 64 GB Intel® X25-E SATA Solid-State Drive to provide data writing services. Finally, the solution uses an enterprise 1 TB SATA hard disk to store less popular games.

"Unlike our original diskless server, the new solution uses high-performance Intel Solid-State Drives for stable, high-speed data reading and writing operations. This

Recommended diskless server configuration for Internet café that can support 120 clients

Motherboard	Motherboard based on Intel® 5500 chipset
Central processor	Intel® Xeon® processor E5506
Memory	4 x 2 GB UDIMM ECC DDR3 1333
Reading storage (array)	1 x enterprise 1TB SATAII hard disk
Writing-back storage (array)	1 x 64 GB Intel® X25-E Solid-State Drive
Operating system disk plus popular games in Internet cafés	1 x 80 GB Intel® X25-M Solid-State Drive
Case and power	Compatible products from a third party
Software platform	Provided by RichTech System Ltd.*

simplifies our diskless server storage architecture and removes the I/O bottleneck of traditional mechanical hard drives," says Chen Jun. "Tests have confirmed that this diskless server solution with its outstanding performance and great practicability is completely capable of meeting the current requirements for data reading and writing needed by Internet cafés."

Enhance customers' entertainment experience

Break the bottleneck from data reads and writes

This new solution combines two different Intel Solid-State Drives for fast and efficient data handling of reads and writes. The 80 GB Intel Solid-State Drive is optimized for data reading, improving startup speed of clients, and loading speed of games. Diskless servers frequently use a 64 K data block write-back operation. Intel provides customized firmware designed for writing back large numbers of small data packets, which takes the data writing performance of the 64 GB Intel enterprise class Solid-State Drive to the extreme.

Chen Jun says, "Game players are increasingly demanding in their entertainment experience, and even a little delay during the game startup might lead to their dissatisfaction with the Internet café. This new deployment has brought us obvious benefits. Tests showed that the new diskless server storage solution could achieve reading and writing performance up to seven times faster than before. We tested multiple clients by using the same script to load games from the server simultaneously. Game loading speed was twice as fast compared to the original server, which would greatly enhance customers' entertainment experience in our Internet café."

Optimized for the applications in Internet cafés

Servers based on the Intel Xeon processor 5500 and 5600 series not only provide superior computing performance, they also support the new Intel® QuickPath Technology and memory architecture, which provides greater memory bandwidth. Integrated with management software for Internet cafés from RichTech System Ltd., it optimizes applications used in Internet cafés to reduce system delays.

The Intel Xeon processor 5500 and 5600 series integrates many new features including the SSE4.2 instruction set that contains the hardware accelerator instruction CRC32, which can replace the cyclic redundancy check that the upper layer data protocol frequently uses. By implementing this instruction, the data check speed is 6.5 to 18.6 times faster than before and mitigates the data check computing bottleneck that can occur during game upgrading or application patch updating in Internet cafés.

Chen Jun explains, "In order to optimize customers' entertainment experience, we must install game patches or updated programs provided by game developers. This was very hard for us in the past, because as game patches or updates grew larger and more complex, they consumed more server resources and reduced response time. Sometimes, we had to implement the updates during idle time or when there were few customers. But now, the new system solves those issues. We can install game patches or updates at any time without worrying about stressing the system. Consequently, we protected the customers' entertainment experience."

Reduce set-up and operating costs for Internet cafés

Reduce the average cost of the server for each client workstation

High-performance Intel Solid-State Drives, with their outstanding data throughput capability, enable a single server to load data read and write requests from more clients. Chen Jun says, "With a traditional mechanical hard disk, one diskless server can optimally support only 60 to 80 clients, while the number is growing to 120 clients now. We save on the average per-client cost of a diskless server by up to 40 percent."

Reduce management and maintenance cost of the server

In the Internet café environment, the most common hardware failure is a hard drive failure caused by heat generated from frequent data reads and writes to and from the hard disk. When using a RAID 0 disk array in the Internet café scenario, any failure on any hard drive might lead to interruption of the server. Chen Jun added, "The benefits brought to us by the new solution are much more than we expected. First, we could implement a smooth and seamless transfer between old and new solutions. Second, the innovative approach of incorporating Intel Solid-State Drives into the server storage system—including cases, power, and other devices—simplified

Maximize business value

- **Attracts and retains customers**

  Optimized for applications in Internet cafés, the innovative diskless server solution of using high-performance Intel Solid-State Drives combined with the Intel Xeon processor 5500 and 5600 series improves customers' entertainment experience, helps to attract more customers, and builds upon the loyalty of existing patrons.

- **Increases return on investment**

  Intel Solid-State Drives break the data read/write bottleneck found with traditional mechanical hard drives, allowing a single diskless server solution to support more PCs and reducing the average cost of a diskless server for each client by 40 percent.

- **Reduces the operating cost of Internet cafés**

  Incorporating Intel Solid-State Drives as part of the diskless server solution for Internet cafés provides a simpler, more straightforward architecture that lowers maintenance costs. Taking advantage of both longer server uptime and energy-efficient features contributes to savings and a lower total cost of ownership.

the architecture by eliminating the need for the SAS array controller. This reduced the number of failure points and not only lowered the risk of server failure, but also reduced the management and maintenance costs of server resources. In addition, the server is more stable, with a much longer uptime."

Lower routine operating costs for the Internet café

Since the high-performance Intel Solid-State Drives use NAND flash memory chips instead of mechanical discs and heads with high-speed rotation to implement data reading and writing, these devices reduce energy consumption and heat while having a longer lifecycle. Chen Jun says, "The new diskless server storage solution not only helps us save in cooling costs, but also saves on the cost of energy. Statistics collected after deploying the new solution show that we can save 35 percent, or even more, just on the energy consumption."

Accelerate expansion of Internet cafés

Optimized for Internet cafés, the diskless server solution for Internet cafés using high-performance Intel Solid-State Drives combined with Intel Xeon processor 5500 and 5600 series effectively reduces application system delays and improves the customer's entertainment experience. The simplified storage architecture of the new diskless server is easy to manage and maintain. This innovative solution removes the data read/write bottleneck of the original storage system, allowing a single diskless server to support more clients. Deploying this new system enabled Shanghai BaBaiLong Internet café to provide customers with a better entertainment experience at a lower operating cost, while positioning the company for accelerated development and growth of Internet cafés.

Find a business solution that is right for your company. Contact your Intel representative or visit the Reference Room at **www.intel.com/references.**

Spotlight: Shanghai BaBaiLong Internet café and RichTech System Ltd.

- Established in 2008, the Shanghai BaBaiLong Internet café is a large Internet café with about 350 client PCs.
- RichTech System Ltd. is the first manufacturer to offer centralized deployment and management software with proprietary intellectual property rights for desktop systems.
- In April 2010, Rich Tech Systems' I-café management application won first prize for "most satisfied diskless management software for Internet cafés in 2009" at the fifth Internet Café Survey and Investigation event held by World Net Union*, a portal server for the Internet café industry in China.

SOLUTION PROVIDED BY:

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