(intel®)

Intel® Xeon® Processor Accelerates Rendering Services

Bingo's BingoCloud* cloud computing platform, based on cloud computing solutions from Intel, helps optimize utilization of rendering resources

Founded in 2003, Bingo Software Development Company launched BingoCloud, the first commercial infrastructure as a service (IaaS) based on a cloud computing platform, in 2010. One of its top clients, Beijing Rendering Company, has built its enterprise private cloud computing platform on BingoCloud, allowing it to automate the management of infrastructure hardware and software across the organization and standardize various IT service capabilities to provide quality rendering services for its customers that include cultural creative and design companies. Since 2007, Beijing Rendering has been providing rendering services to more than 400 film and television animation businesses and thousands of projects. With the increasing number of customers and dramatic growth of business, it now faces new challenges in providing quality rendering services to its existing and new customers.

CHALLENGES

- **Improve utilization of rendering resources.** To avoid resource competition, computing resources are dedicated to different rendering projects, leading to inefficient use of computing resources.
- **Shorten rendering environment deployment time.** Manual provisioning of a large-scale rendering environment for each rendering project requires much time and human resources.
- **Ensure user data security.** Physical separation is not an ideal solution to enforce security and isolation between different rendering projects while meeting the service-level agreements (SLAs).
- **Improve management of decentralized rendering resources.** Since data centers in different locations were managed individually, rendering resources could not be managed and provisioned centrally.

SOLUTIONS

- **Deploy BingoCloud cloud computing platform using Intel® Xeon® processor 5600 series.** Ensure unified control of the enterprise's scattered rendering resources and distribute them on the basis of actual needs, as well as integrate them with improved utilization.
- **Deploy rendering environment by self-service.** Allow users to customize their needs through the self-service Web interface of the BingoCloud cloud computing platform to deploy a rendering environment based on their needs.
- **Enhance user data security.** Isolate rendering data of different users through dynamic virtual local area network (VLAN) and employ public key infrastructure (PKI) to ensure data security.

IMPACT

- **Improved utilization of rendering resources.** With Intel® Virtualization Technology (Intel® VT) unified management of the rendering resources was achieved, and supply of the rendering resources can be conducted on an as-needed basis.
- **Enabled construction of rendering environment automatically on an as-needed basis.** Based on Intel VT, rendering environment deployment for more than 100 servers was completed within two hours by just one staff member.
- **Safe isolation support for render mode of multi-tenants.** Safely isolated different users' data, and safely and quickly stored and retrieved it in the distributed storage.
- **Provided unified scheduling of the scattered data centers' rendering resources.** Unified scheduling and management of the scattered data centers' rendering resources has become possible, and the overall rendering capabilities have been improved.

> "Bingo's BingoCloud cloud computing platform, based on cloud computing solutions from Intel, helps the rendering industry deploy a cloud computing platform quickly. For example, Beijing Rendering, which deployed this program, has shortened its rendering environment preparation time for its more than 100 rendering servers. In the past, preparation time took three days to complete by four staff members, but with Intel solutions, it only takes two hours and can be handled by only one staff member. With Intel solutions, rendering resources have been fully utilized and improved rendering efficiency."

Qiu Yang
Product Manager
Guangzhou Bingo Software Development Co., Ltd.

Render services on the rise

Globally, the computer animation-based television industry has witnessed explosive growth. As it continues to grow, the industry has begun to gradually develop in the areas of HD, Ultra HD, and 3D film, which allow the pictures to become finer and the quality much better. With this development, relevant processes – from animation modeling to rendering – demand higher computing performance and storage capacity. To meet increasing business volume and highly demanding delivery time for customers, movie and television rendering companies such as Beijing Rendering continue to face daunting challenges to ensure superior render services.

## IT challenges in business operation mode

Beijing Rendering has a standard rendering process. First, the rendering team estimates required operation and storage rendering resources based on historical experience. Next, the team prepares the rendering environment for the software or plug-ins. When all is ready, the team can start the rendering process.

The technical department of Beijing Rendering found out that although theoretically these rendering servers could meet the operation and storage needs of its existing business, from time to time, the rendering services could not be delivered on schedule. The department identified several challenges:

The rendering resources cannot be distributed evenly. Sometimes applications with different users or characteristics are deployed on one server. With rendering tasks running at the same time, these applications compete for resources, causing unstable server performance. As a result, it's impossible to fully guarantee the service quality of the rendering company. To solve this problem, the company adopted a mode that allowed different rendering tasks to use the server's resources exclusively. However, this mode caused a problem: since the rendering team overestimated the rendering time required, when the rendering task was completed, the rendering resource could not be quickly delivered to other rendering tasks due to the different rendering environments. Rendering resources were wasted, since they could not be used to their full capacity.

Preparation time for the rendering environment is too long. Since different customers and rendering tasks may require different rendering software, plug-ins, and
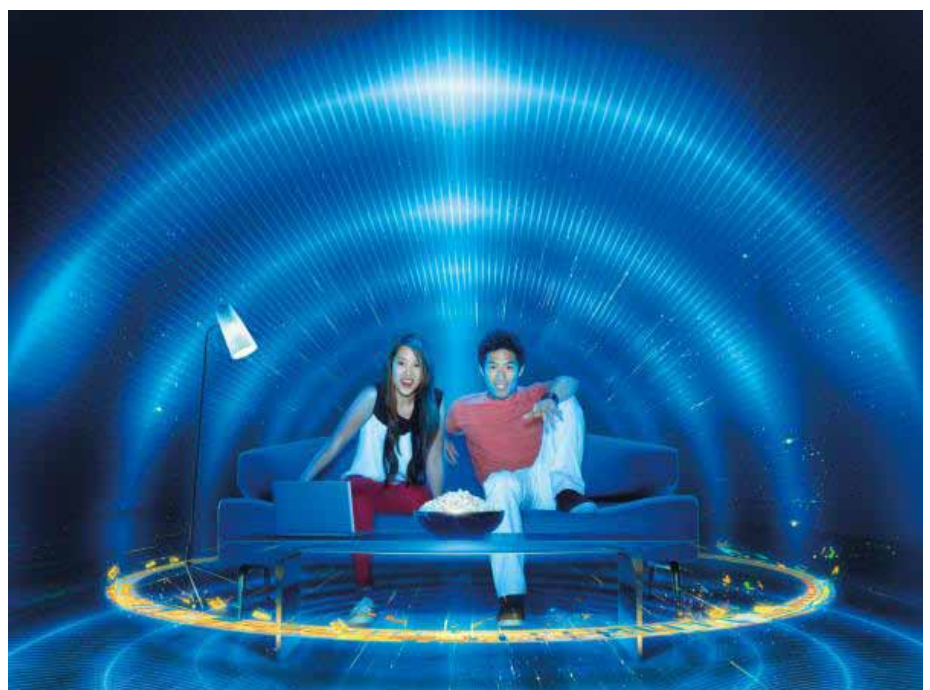
Utilizing cloud computing solutions based on Intel architecture, rapidly deploy rendering environments, and improve utilization of rendering resources.

cluster management software, much time and effort was spent manually deploying and configuring rendering. Generally, it took three staff members four days to prepare the rendering environment for more than 100 servers. On one hand, this task required the employees to have professional technical knowledge; on the other, the rendering service time was delayed and the service capabilities were compromised.

Also, protecting image and intellectual property is particularly sensitive in the animation, film, and television industry. Beijing Rendering assigned different roles and authorization for different rendering jobs. However, since different companies and enterprises used the same platform, there was a concern that user data might be attacked by hackers, risking data leakage. To solve this, Beijing Rendering physically isolated rendering servers for some particularly important customers. Obviously, this wasted rendering resources.

Beijing Rendering's servers are distributed in data centers in different regions. Although the data centers are connected through high-speed Internet (e.g., optical fiber), the servers, storage, and network configuration for these data centers are different, so each data center required special IT maintenance personnel. When there was a large-scale rendering project, rendering resources could not be used together.

Meeting render service needs with BingoCloud

To solve these problems, Beijing Rendering considered deploying a private cloud computing platform. Through testing and comparing of peer cloud computing products, the company chose Guangzhou Bingo Software Development Co., Ltd.'s (Bingo) BingoCloud cloud computing platform.

Based on cloud computing solutions from Intel, BingoCloud offers a developed and standard open cloud computing interface and technology. By using this platform, Beijing Rendering can not only make full use of existing servers and other IT infrastructure,

but has also transformed its business operation mode, significantly improving rendering efficiency.

Rendering resources now exist in the form of virtual machines. By utilizing Intel Xeon processor 5600 series and Intel VT, BingoCloud provides a high-performance, reliable, and secure platform for the virtual machines. This allows each virtual machine to be independent, with its own operating system and assigned resources. This avoids competition for resources by making it possible to run multiple rendering jobs on shared physical servers and helping to provide a stable system for all rendering jobs.

BingoCloud also allows automatic recovery of computing resources. For example, the platform can automatically release computing or storage resources after the rendering task is completed. Alternatively, it can set the automatic release of rendering resources when the occupancy rate of the virtual machines is below 20 percent in an hour. Beijing Rendering not only achieved needs-based distribution of rendering resources, but also significantly improved its resource utilization.

Improved render services

After deploying BingoCloud cloud computing platform based on Intel® Cloud Builders, Beijing Rendering dramatically reduced preparation time for the rendering environment. BingoCloud integrates scattered computing and storage resources, forming a unified resource pool. Now the rendering team only needs to estimate resource requirements for computing and storage based on the current rendering project. After entering the required rendering engine, version, third-party plug-ins, and resource requirements through the platform's self-service Web interface, the rendering nodes are provisioned automatically. Complex jobs such as installing the operating system and installing and registering the third-party plug-ins are carried out automatically.

"BingoCloud is so easy to use," says a Beijing Rendering staff member. "A job that used to take several days to be completed can now be done in minutes. Previously, when there was

a new project, we would worry that the long preparation time for the rendering environment could affect the project's progress. Now, with this platform, we are freed from the complex rendering environment preparation, allowing us to work more efficiently."

In addition, BingoCloud, based on the Intel cloud architecture program, upgrades user data security to a new level. All the data included in the rendering clusters built by different users, such as raw materials, modeling files, and output results, can be automatically protected and isolated. Meanwhile, measures such as public key infrastructure (PKI) can be used to ensure the security of the data access, making it easier to maintain the user SLA.

BingoCloud also solves the problem of unified management of the multiple data centers. Now, when there is a large-scale rendering task, Beijing Rendering can quickly combine the rendering nodes of the multiple data centers into a cluster to execute the same rendering task.

"Deployment of BingoCloud has brought great benefits to Beijing Rendering that were beyond their expectations," explains Qiu Yang,

product manager at Bingo. "Through Intel® Node Manager, BingoCloud allows administrators to set resource scheduling mode through the Web interface. Data center power consumption can be evenly distributed to each server, thus avoiding system failure resulting from the data center's local resources overheating. This enhances the stability of the rendering server."

Looking ahead, Bingo will continue to deepen its cooperation with Intel. It plans to test the compatibility of Intel® Ethernet 10 Gigabit Server Adapters and high-performance Intel® Solid-State Drives with its system to provide a better quality cloud computing platform for its customers.

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