



VOD Innovation Case Study

Dual-Core Intel® Xeon® Processor 5160
Video-on-Demand Service



NTT Communications scales up VOD system with Dual-Core Intel® Xeon® processor-based servers

Problem OCN, the Internet Services Provider arm of Japan's NTT Communications Corporation, has a broadband-based Video-on-Demand (VOD) service offering. The company was looking for hardware enhancements to its IT infrastructure to meet the growing demand for its VOD services. In addition, it wanted to ensure improved system availability and scalability to be able to provide additional services in the future.

Solution OCN expanded its VOD system, using servers based on the Dual-Core Intel® Xeon® processor 5100 series to provide its customers with a great viewing experience. In addition to an increased performance advantage that came with the Dual-Core Intel® Xeon® processor 5160, the VOD system also saw an increase in system availability and price-performance.

Increased demand for VOD service fuels system upgrade project

OCN* Theater* is a Video-on-Demand (VOD) service offered by OCN*, the Internet service provider (ISP) arm of Japan's NTT Communications Corporation. This service allows users to enjoy movies, TV programs, animation, and other types of video content using a set-top box from OCN that connects the TV in their home to NTT Communications' optical broadband network. Introduced in December 2004, this service has steadily grown since its inception, because of its popularity with customers who can watch what they want, when they want.

"As an entertainment service, VOD is still evolving. It is like being involved in a venture business, and we need to keep adding new service innovations at a rapid pitch to keep our customers happy," says Atsuko Oka, General Manager, NTT Communications.

"Like with any VOD service, any faults in the system reflect directly on the service. We have, therefore, regularly upgraded our servers to provide a great customer experience. Thus, server bandwidth was doubled in the second generation system deployed in September 2005, and doubled yet again in September 2006 to meet the growing customer demand for our services," says Shogo Nishi, Principal Engineer, NTT Communications.

Dual-core processors deliver full benefits of multi-threaded software

The third-generation VOD system implemented in September 2006 was built using NEC* Express5800* servers based on the Dual-Core Intel® Xeon® Processor 5100 Series in order to boost performance to "four times that of the first-generation system".

"The reason we selected the Dual-Core Intel Xeon Processor 5160-based servers was because the software used in OCN Theater is multi-threaded. Dual core processors make it very easy to run such multi-threaded applications. Also, Intel® Xeon® processor-based servers are being used in other video distribution services and thus it was an easy decision for us," Mr. Nishi says.

"In systems that handle video, CPU performance has a direct impact on the level of service. The selection of dual-core processors was a significant factor in the increase in CPU performance," he adds.

Typically, there are four potential bottlenecks in a streaming distribution system: the disk I/O, NIC I/O, CPU, and memory performances. The disk I/O uses a SAN configuration, which is reconfigurable, and extra memory can be added as required. "With the CPU, however, so long as you continue to use a particular machine, you are stuck with the level of performance it provides. Thanks to the big step-up in CPU performance on the new system, we are glad that the overall life cycle of the third generation system will be longer," comments Ms. Oka.

Improved availability

The choice of the Dual-Core Intel® Xeon® Processor 5160-based servers delivered benefits in three areas: timeframe, cost-benefit, and availability. "The fact that we were able to double our existing distribution capacity in just two to three months was due to the choice of Intel dual-core processors," notes Mr. Nishi.

The third-generation system also represents a big improvement in the price-performance ratio compared to the first- and second-generation systems. While OCN's experience with the previous system suggested that a large number of new servers would be required, what they actually found was that a smaller upgrade than initially anticipated delivered more than enough performance. Keeping the number of servers low also resulted savings on the operational costs for the monitoring service.

Having excess distribution capacity also improves system availability. Since the previous system was at full capacity, maintenance prior to the upgrade had to be performed quickly and in the early morning when system usage was low. After the upgrade, on the other hand, maintenance is no longer subject to the same time pressures. The resulting system infrastructure ensures "service continuity" – the most important factor for a video distribution service.

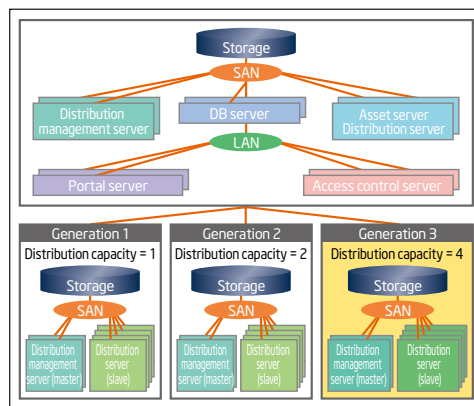
CPU performance for content conversion processing

The distribution services run by NTT Communications are not limited to services such as OCN Theater that use a set-top box. The company also operates image content distribution services aimed at other devices including PCs and mobile phones. "Even greater processing performance is likely to be required for processing such as content conversion used in general image content distribution services, not just VOD.

"Although we have installed dual-core models for the time being, in the future we want to be able to add even higher performance systems such as quad-core as and when we need them," comments Ms. Oka.

Trial Results

- A doubling in existing processing performance was achieved quickly in only two to three months
- Higher performance means the number of servers can be kept low and this reduces operational and monitoring costs
- Ensuring that the system has adequate processing performance makes operation more flexible and improves system availability



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