Yahoo! JAPAN gains exceptional data center efficiency with AMD EPYC™ CPUs

Reduced rack footprint and improved virtualized performance with AMD EPYC processors

AMD EPYC

Launched in 1996 as the Internet's first Japanese-language search engine, Yahoo! JAPAN now offers a wide range of services, from a search engine to delivering a comprehensive portfolio of Internet applications. But they all have one thing in common – a hunger for computational power. In a context of ever-increasing demand born out of continuing success, Yahoo! JAPAN found that AMD EPYC™ processors could deliver an exceptional level of efficiency for its data center.

Consolidating onto one platform

"Yahoo! JAPAN is a Japanese regional content provider," explains Keita Uchida, Senior Server Engineer, Yahoo! JAPAN. "Our major business encompasses a wide range of applications, from media to e-commerce, as well as search. Including our other solutions, we provide about 100 different services. In a study by Nielsen, in terms of total reach we are number one in the Japanese market."

This extensive portfolio of services means that Yahoo! JAPAN wants servers that can deliver outstanding performance across a broad selection of applications via a virtualized environment. "We needed to consider how much data center footprint is used to deliver a given level of computer resources," says Uchida. Recently, the level of demand had led to increasing power consumption per server, reducing the efficiency of rack utilization. This reduction in efficiency was a key factor for Yahoo! JAPAN as they looked into ways to improve cost effectiveness by running more virtual machines per rack.

"We have to provide as much performance as possible within a limited data center

footprint, both in terms of space and power consumption," says Uchida. "On our virtualized platform we are running Yahoo! JAPAN's core business, including a web application database, the search engine, distribution services, and applications." Yahoo! JAPAN wanted to consolidate all these disparate functions onto a more uniform infrastructure. "We were seeking to migrate to a common platform."

AMD EPYC processors began receiving increased press attention in 2019. This led Yahoo! JAPAN to explore the CPU's potential. Yahoo! JAPAN's hardware partner was also offering appropriate configurations powered by AMD EPYC CPUs. "We were trying to find the right processors to build a platform that consumed less power and space for our applications," says Uchida.

The potential of AMD EPYC processors was enormous, but Yahoo! JAPAN wanted to know that the CPU could deliver on this potential in practice. "We use our common platform for every purpose," says Uchida. "So, we didn't initially conduct performance verification benchmarks for specific workloads. Instead, we used a general benchmark test. However, we weren't just looking at the result of the benchmarks, but also how the processors could deliver our virtualized platform. We compared the processors based on the same level of performance per virtual machine, and then how many virtual machines could be run simultaneously. That number scales with the number of cores, but in the case of 2nd Gen AMD EPYC CPUs the frequencies are also better."

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> *Keita Uchida, Senior Server Engineer, Yahoo! JAPAN*

More VMs, less power consumption

These positive results allowed Yahoo! JAPAN to deliver the efficiencies it wanted. "To run the same number of VMs, we can reduce the number of hypervisors with AMD EPYC processors," says Uchida. "As a result, we can reduce the power usage and the number of racks in the data center. We were able to reduce the number of racks by about 20 percent compared to our previous racks of servers," says Uchida. "The performance and power usage of the AMD EPYC CPU-powered servers is really excellent. We can use them for all the applications and workloads we need."

After seeing these benefits, in 2020, Yahoo! JAPAN deployed 500 nodes powered by 2nd Gen AMD EPYC CPUs, adding a further 4,000 in 2021, and continuing the rollout in 2022. "We are using 1U servers with the 64-core 2nd Gen AMD 7702P processor, 1TB memory, 64TB NVMe® storage and 25Gbit networking," says Uchida. "We are using single-socket servers for two reasons. First, it provides better efficiency in terms of VM allocation. Second, a single processor provides better energy consumption because no power is used for communicating between two processors."

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Keita Uchida, Senior Server Engineer, Yahoo! JAPAN

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Migration to AMD EPYC recommended

Migrating users to the new platform was completely transparent. "We are providing resources to users through hypervisors," says Uchida. This abstracts the hardware from the users. "So, when we migrated to the EPYC CPU-powered servers, our application users had a seamless experience." Despite initially doing general benchmarking to assess performance, Yahoo! JAPAN wanted to know that the most strenuous applications would function properly. "We conducted verification tests with 2nd Gen AMD EPYC processors for actual applications. We found that the EPYC CPU-powered servers could provide not just power efficiency, but increased performance as well. As a result, we could easily migrate the highest-performance environments to the EPYC CPU-powered servers."

This has enabled some users to migrate to a virtualized environment who hadn't been able to use this technology before. "Some of our users have a particularly demanding performance requirement," says Uchida. "In the past, they were using bare-metal servers, because when they tried to employ a hypervisor-based platform, they found that the performance was decreased. But with 2nd Gen AMD EPYC CPU clusters, our demanding users preferred the performance to that of bare-metal servers. This has meant they could migrate to the virtualized platforms without any problems. For example, the search engine consumes a lot of compute resources, and for that system, the performance has been increased."

"EPYC CPU-powered servers have exceptional performance and power usage, making them ideally suited to running hypervisors," says Uchida. "Now around 20 percent of our workloads are running on the EPYC CPU-powered servers." The percentage of AMD EPYC CPUs in the Yahoo! JAPAN infrastructure is set to increase as the company expands its data center upgrades. "We are continuing the migration to EPYC CPU-powered servers from the previous legacy systems," says Uchida. "We are looking forward to AMD releasing the 4th Gen EPYC processors. The core density per server will be further increased, so we can reduce the data center footprint even more. Some of our users are currently still sticking to bare-metal because their performance requirement is really demanding. But EPYC processors provide outstanding power efficiency for virtualization so even those customers really should migrate to EPYC."

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