CASE STUDY

Service Providers
Data Center

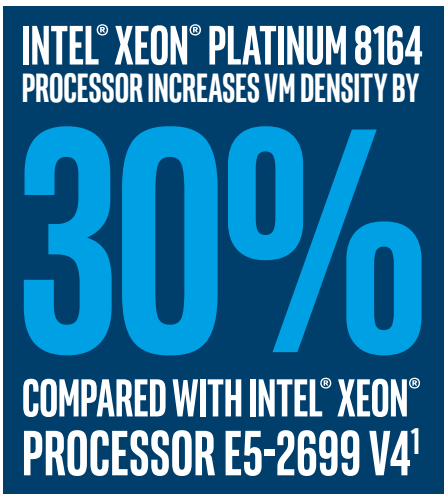
Douzone Bizon Selects Intel® Technology to lower TCO

Intel® Xeon® Platinum 8164 processor increases virtual machine density, reducing number of physical servers, as well as required floor space, power, and cooling

At a Glance:

- Allows Douzone Bizon to lower the total cost of ownership (TCO) of its cloud server environment
- Enables Douzone Bizon to maintain its edge in a fiercely competitive market segment

Maximizing Potential
DOUZONE BIZON



Korean cloud service provider (CSP) Douzone Bizon was looking to lower the total cost of ownership (TCO) of its infrastructure. It thought that the Intel® Xeon® Scalable processor would allow it to increase virtual machine (VM) density in its blade server environment, saving on physical servers, data center floor space, power, and cooling. To test this theory, Douzone Bizon launched a proof of concept (PoC) based on real-life workloads.

Challenge

- Douzone Bizon's challenge is to offer customers high-performing and reliable cloud services for a low TCO

Solution

- Douzone Bizon carried out a PoC to investigate whether upgrading to Intel Xeon Scalable processors would enable it to increase VM density
- It also ran a further performance test to verify that I/O performance in storage could be improved with Intel® Optane™ technology

Results

- The PoC showed that the Intel® Xeon® Platinum 8164 processor increases VM density by 30 percent compared with its current Intel® Xeon® processor E5-2699 v4[1]
- Fewer physical servers require less data center floor space, power, and cooling
- By lowering TCO, Douzone Bizon can ensure it remains competitive

Business Challenge: Lowering TCO

Douzone Bizon is a leading Korean Software as-a-Service (SaaS) cloud provider. Like all CSPs, Douzone Bizon must continually strive to offer the best services for the lowest TCO.

To maintain its competitive edge, Douzone Bizon regularly upgrades and adds to the functionality of its SaaS applications. These upgrades typically demand more memory and processing performance. To accommodate these additional demands in a cost-effective manner, Douzone Bizon was keen to increase the VM density of its infrastructure, so it could reduce the total number of physical servers needed. Fewer physical servers require less floor space, power, and cooling, thereby lowering TCO. Infrastructure stability was also a critical factor, enabling Douzone Bizon to continue providing reliable services to millions of customers.

Proof of Concept

Douzone Bizon's existing Intel Xeon processor E5-2699 v4-based servers were limited to up to 100 VMs per node. It was interested in upgrading to the Intel® Xeon® processor E7 family to increase VM density, but it was concerned this processor would not be suitable for its blade server environment, since its 2-socket blade servers did not support the Intel Xeon processor E7 family.

Instead, Douzone Bizon thought that the higher core count and greater memory capacity of the Intel Xeon Scalable processors would be a more suitable choice for increasing VM density in its blade server environment. To test this theory and ascertain whether Intel Xeon Scalable processors could achieve the desired level of performance and optimization, Douzone Bizon launched a PoC based on real-life workloads.

The PoC compared the VM density optimization of the Intel Xeon processor E5-2699 v4 with the Intel® Xeon® Platinum 8180 processor running real service workloads on its tax and enterprise applications. It also carried out a processor stress test, and a further analysis to compare the I/O performance of Intel® Solid-State Drives DC P3500 and P4500 (Intel® SSDs DC P3500 and P4500) with Non-Volatile Memory Express* (NVMe), with the Intel® Optane™ SSD DC P4800X.

Increased VM density

Douzone Bizon tested real service workloads on 16 tax and 124 enterprise applications at a VM ratio of 9:1. The Intel Xeon Platinum 8180 processor reliably ran up to 140 VMs versus 100 VM for the Intel Xeon processor E5-2699 v4 – an increase of 40 percent[1].

The overall CPU utilization of the Intel Xeon Platinum 8180 processor was stable up to 50 percent, leaving headroom for even more VMs – see figure 1. Douzone Bizon concluded this would maintain stable operations, as VMs could still be migrated in the case of server failure or maintenance. If needed, Douzone Bizon could still install more system memory, up to 90 percent, to run more VMs. Any more than 90 percent would make it difficult to handle the huge dump size in case of a server failure.

Although the customer ran 140 VMs in the PoC, it decided that a total of 130 VMs per single server would be more appropriate in a production environment to assure a high level of reliability, scalability, and performance.

To check how much CPU overload the Intel Xeon Platinum 8180 processor-based system could support, Douzone Bizon carried out an additional test using an in-house build-up process stress tool. Assigning 2x CPUs per VM the test verified the utilization of all vCPUs (60 cores) running up to 30VMs – see figure 2[2]. Douzone Bizon concluded that it was possible to maintain service without any issues even under the most extreme circumstances.

A further performance test was carried out to verify that I/O performance could be improved by using NVMe and Intel® Optane™ technology. Since Douzone Bizon is using mostly external storage for now, the I/O throughput test results will be used to inform a future review of external storage and are not available for publication at the present time.

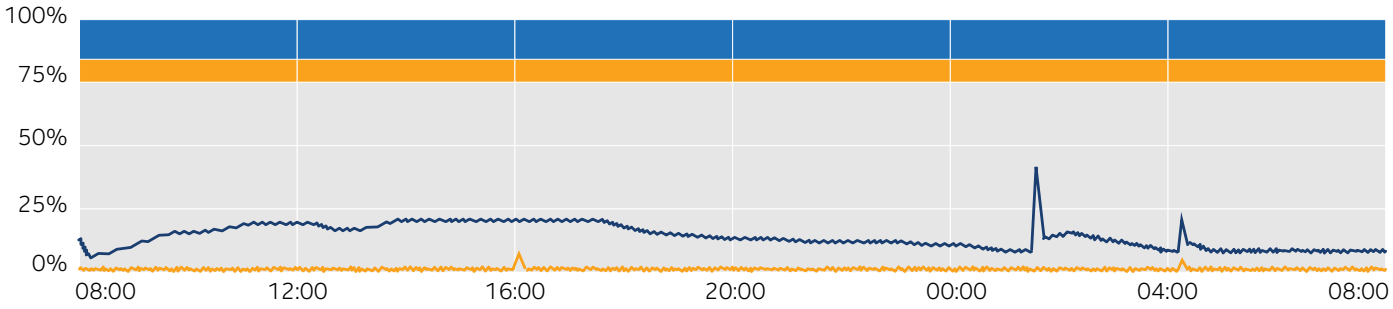


Figure 1. CPU utilization for the Intel® Xeon® Platinum 8180 processor using real service workloads.

[1] Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit www.intel.com/benchmarks

Configurations: Compared the performance of the Intel® Xeon® Gold 8180 processor with 28 cores, 2.5GHz, 205W, and 640GB and the Intel® Xeon® processor E5-2699 v4 with 22 cores, 2.2 GHz, 145W, and 512GB; all running Windows Server* 2012 R2. CPU performance measured using real service workloads.

Performance results are based on estimates as of 2018 and may not reflect all publicly available security updates. See configuration disclosure for details. No component or product can be absolutely secure.

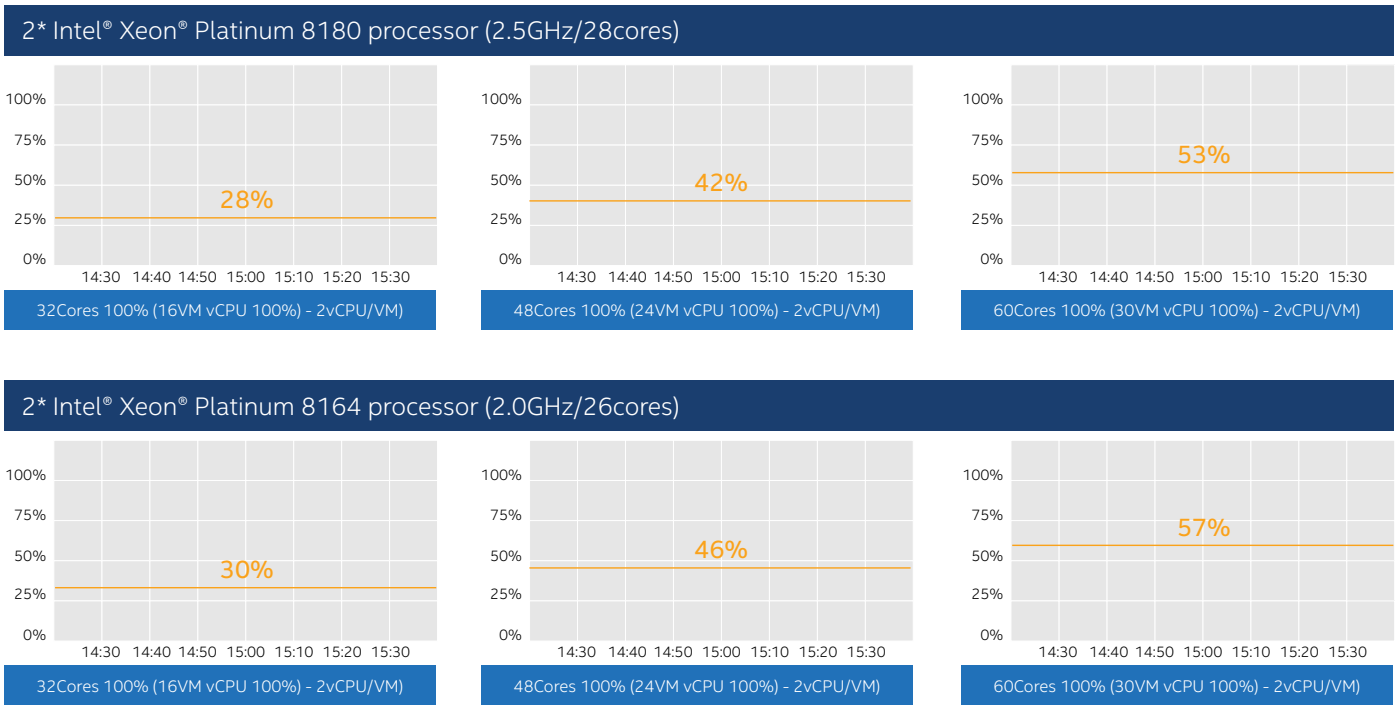


Figure 2. vCPU utilization for the Intel® Xeon® Platinum 8180 processor using in-house build-up process stress tool.

Why Intel?

The Intel Xeon Scalable processor offers Non-Uniform Memory Access (NUMA) – a technology unique to Intel, and Uniform Memory Access (UMA) latencies equal to competitor processors but with much less variability. It also has memory bandwidth to support all PCIe bandwidth and CPU core needs. Meanwhile, on-chip mesh architecture provides a more direct path for data to travel than the previous ring architecture, as well as many more pathways to eliminate bottlenecks.

As well as supplying CPU and SSD hardware, Intel also provided Douzone Bizon with ongoing support throughout the PoC. This included customer seminars and training on Intel® Software Development Tools (compilers, performance libraries, and tuners) and evaluation copies so that Douzone Bizon could draw out the best performance from the Intel Xeon Platinum 8180 processor platform. Intel also carried out OEM matchmaking and worked closely with the OEMs to ensure enough samples were available to carry out the PoC, and that the production servers were ready on time.

Following the PoC, Douzone Bizon decided to roll out the Intel Xeon Platinum 8164 processor to support its Infrastructure as-a-Service (IaaS) and enterprise resource planning (ERP) service offering. The Intel Xeon Platinum 8164 processor offers an improved price/ performance ratio for its needs, than the Intel Xeon Platinum 8180 processor.

Douzone Bizon was impressed by the test performance of the Intel Optane SSD DC P4800X, but it has not yet decided whether to deploy. It expects to carry out further testing in the near future to identify which area of its business would benefit the most from this technology.

Business benefits

The Intel Xeon Platinum 8164 processor provides the necessary performance and memory to support increased functionality and software upgrades with a higher VM density. In turn, this reduces the number of physical servers, floor space, power, and cooling required, lowering TCO.

Douzone Bizon expects to see increased demand from customers for more diverse services in the future. To

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accommodate this, it is planning to roll out Intel Xeon Scalable processors to support even more of its services. This includes an enterprise D-ERP* offering to extend its ERP customer base beyond small and medium-sized business, as well as a Groupware as-a-Service offering which will allow customers to manage their infrastructure more efficiently and provide a better service to their customers.

Conclusion

Early engagement and close collaboration with Intel enabled Douzone Bizon to optimize VM density from 100 VMs to 130 VMs per node, significantly lowering the TCO of its cloud server infrastructure and opening up new service opportunities[1]. Additional testing has also shown that Intel Optane technology could support Douzone Bizon with its future goal to increase I/O performance in storage. Given the successful outcome of this PoC coupled with Douzone Bizon's demands for increasingly higher performance and memory capacity for a low TCO, Douzone Bizon is now open to investigating the benefits of Apache Pass on Intel's next-generation server platform codenamed Cascade Lake.

Technical Components of Solution

- **Intel® Xeon® Platinum 8164 processor** for high VM density performance, scalability, and advanced reliability.
- **Intel® Optane™ SSD DC P4800X** for advanced I/O performance.

Spotlight on Douzone Bizon

Douzone Bizon Co. Ltd. provides IT solutions and services. It is a leading Korean software as-a-Service (SaaS) cloud service provider. Its products and services include accounting programs; enterprise resource planning (ERP); cloud; groupware; information security; electronic tax invoices; electronic banking; mobile solutions; electronic fax; music, English and lifelong education services; and other services. The company was founded in 1991 and is based in Chuncheon, South Korea. For more information visit www.douzone.com

Learn More

- Intel® Xeon® Scalable processors - www.intel.com/xeonscalable
- Intel® Optane™ SSD DC P4800X - https://www.intel.com/content/www/us/en/products/memory-storage/solid-state-drives/data-center-ssds/optane-dc-p4800x-series.html
- Intel® Cloud Insider Program - www.intel.com/cloudinsider

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