

STMICROELECTRONICS BOOSTS CHIP DESIGN SPEED AND ENHANCES SUSTAINABILITY WITH AMD EPYC™ PROCESSORS

Europe's largest semiconductor company optimized the performance, cost, and energy consumption in its R&D data center by choosing AMD EPYC CPUs



CUSTOMER



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INDUSTRY

Semiconductor design and manufacturing

CHALLENGES

Enabling R&D data center performance to keep pace with increasing chip design complexity while keeping within sustainability goals

SOLUTION

Deploy HPE servers and Microsoft Azure cloud instances powered by 3rd Gen AMD EPYC™ processors

RESULTS

12 percent better performance, up to 30 percent lower cost per core, 30 percent lower power consumption per core, 33 percent lower data center electricity consumption, faster chip design delivery

AMD TECHNOLOGY AT A GLANCE

3rd and 4th Gen AMD EPYC™ CPUs

TECHNOLOGY PARTNERS



Hewlett Packard
Enterprise



Microsoft

The design and manufacturing of computer chips gets more intensive with every generation. As transistor sizes reduce, complexity increases exponentially.

This creates an insatiable need for greater computational performance for production workflows. Europe's largest semiconductor company STMicroelectronics has a constant battle to keep the pace of its data centers up with the demands of its design processes. AMD EPYC™ processors enabled the company to fulfill all three of its criteria—performance, price, and power consumption—providing much faster chip design delivery to its customers while maintaining sustainability goals.

R&D performance and energy use challenges

"We want to decrease our energy consumption by 150 gigawatt hours per year and become carbon-neutral by 2027," says Olivier Joubert, DTIT Senior Infrastructure Architect, STMicroelectronics. "It's a big challenge for a company with double-digit growth for the past few years as we add new factories, data centers, and increased capacity, so it's very important that we choose the right data center server technology."

Since STMicroelectronics both designs and manufactures semiconductors, it needs data center computation in three main areas. Each factory has at least two data centers, while the general business IT infrastructure is centralized in both on-premises data centers and the cloud. But its largest requirement comes from its research and development data centers. "When we halve the size of our semiconductor transistors, the density increases, and we need four times the data storage and compute," says Joubert.

The largest STMicroelectronics R&D data center capacity is in France. Data centers in Italy and India provide the remainder of the processing capability. Improving R&D data center computational capacity has a real impact on STMicroelectronics' ability to build newer, more complex chip designs. However, this poses further challenges for the company's environmental goals. "Sustainability is in the DNA of STMicroelectronics," says Joubert. "We've been in business for 36 years, and we've been publishing a sustainability report for 25 of them. We strive to consume less."

These challenges mean that STMicroelectronics is constantly evaluating new server technologies as they arrive. "We start with the most important thing for us in a server, which is the CPU," says Joubert. "We have benchmarked all the CPUs for the past 10 years. We always need the fastest processor with the most cores. For a while, there was no competition. But when AMD launched the EPYC processor in 2017, alternatives returned.

When a processor has a good result in SPEC CPU benchmarks, we shortlist it for our own testing." When the 2nd Gen AMD EPYC processor arrived, STMicroelectronics decided to benchmark it. The performance figures

far exceeded the company's expectations.

Better performance, cost, and power efficiency

"We were really impressed by the result of the benchmark," says Joubert. "But we had to wait for the 3rd Gen AMD EPYC processor to enable support for our operating system and application stack."

"We achieved a 33 percent reduction in electricity consumption using 3rd Gen AMD EPYC processors,"

Olivier Joubert, DTIT Senior Infrastructure Architect, STMicroelectronics

STMicroelectronics had already begun to use AMD EPYC processors through the Microsoft Azure Cloud, which the company bursts its R&D workloads into heavily when required. “We work closely with Microsoft to ensure they use the same CPU as we do in our data center.

HPE provided servers and CPUs for STMicroelectronics to test in its own data center. “The benchmark we’re running for R&D is Electronic Design Automation (EDA) and Computer-Aided Design (CAD),” says Joubert. “With 2nd Gen AMD EPYC processors, we saw 6 percent more performance than any other CPU on the market. With 3rd Gen AMD EPYC processors, that rose to 12 percent. We got 25 percent better value per core for the single-socket CPUs and 30 percent for the dual socket ones. We also introduced power efficiency tests. The 3rd Gen AMD EPYC reduced consumption per core by 30 percent. This was the first time we met all three criteria—performance, price, and efficiency—so we started to purchase a lot of 3rd Gen AMD EPYC CPUs.”

Dependable roadmap to 4th Gen AMD EPYC

STMicroelectronics began rolling AMD EPYC processors out in its R&D data centers. “We started with R&D because this is the most demanding workload,” says Joubert. “Better performance means faster time to market. Now we can complete a design in much less time. We’re able to design a chip faster and run more designs in parallel than before.”

“With 3rd Gen AMD EPYC processors...[we saw] 12 percent [more performance than any other CPU on the market]. We got...30 percent better [value per core] with dual sockets, [and] reduced power consumption by 30 percent.”

Olivier Joubert, DTIT Senior Infrastructure Architect, STMicroelectronics

This is particularly valuable for industries where semiconductor designs are evolving fast, such as automotive Advanced Driver Assistance Systems (ADAS) or communications networking. STMicroelectronics replaces its R&D data center servers every 27 months on a rolling basis, so is continually increasing its AMD EPYC fleet. By the end of May, it had deployed 550 single-socket HPE servers powered by 64-core 3rd Gen AMD EPYC CPUs

in its data center, and since then the total has exceeded 1,000 CPUs, with many thousands in use via Microsoft Azure as well.

The company has also been able to fulfil its sustainability goals. The increasing energy consumption of core-dense server CPUs is offset by vastly greater performance. The AMD EPYC CPUs and HPE servers are also rated to operate at higher temperatures, enabling the data center air conditioning to be run more sparingly. “We achieved a 33 percent reduction in electricity consumption using 3rd Gen AMD EPYC processors,” says Joubert. STMicroelectronics also licenses its

software on a time basis. The greater performance of AMD EPYC processors means more jobs can be run within that time, saving money.

STMicroelectronics is now testing 4th Gen AMD EPYC processors, with promising results. “We can get at least 25 percent more performance than the previous generation with 4th Gen AMD EPYC CPUs,” says Joubert. “That’s far better than any competitor

available in the market. In our experience, even with 3rd Gen AMD EPYC processors, competitors need 50 percent more power per core, and the CPUs cost 75% more for lower performance. So, 4th Gen AMD EPYC will be even further ahead. There are four things we like about AMD EPYC processors. First, AMD’s ability to execute the roadmap on time. Secondly, supply delivery without any semiconductor shortage. Third, AMD works with the ecosystem, supporting our stack. And finally, there is alignment between preferred partners, so HPE and Microsoft Azure have the same technology.” Encouraged by these benefits, STMicroelectronics is now also considering the addition of AMD GPUs to its data center fleet. “We are incredibly happy to have an alternative to the other CPUs on the market and a partner like AMD.”

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About STMicroelectronics

STMicroelectronics is a global Integrated Device Manufacturer (IDM) that invests in proprietary technologies and an extensive manufacturing footprint. Based in Europe, the company designs, produces, and delivers its products to customers, providing them with the expertise, supply security and quality they need. STMicroelectronics has over 50,000 staff, with over 9,000 of them in research and development, serving more than 200,000 global customers. The company has made sustainability integral to its business for nearly 30 years. For more information visit st.com.

About AMD

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