BOOKING.COM SLASHES DATA CENTER POWER BY 70% WITH AMD

CASE STUDY

Booking.com cut data center energy and halved its footprint using 4th Gen AMD EPYC™ Server CPUs, reducing running costs and carbon emissions

AMD × Booking.com



Booking.com is the largest online travel agency in the world. The company facilitates 1.5 million room nights every day, providing customer access to 3.4 million properties in over 220 countries and generating nearly $27 billion in revenue in 2025. Delivering a consistent customer experience with such a huge volume of business requires potent infrastructure, but Booking.com also has strong sustainability goals. AMD EPYC™ Server CPUs provided the performance and efficiency to satisfy both needs.

"Our mission is to make it easier for people to experience the world, and our infrastructure underpins that," says Jurriën Rasing, Senior Product Manager, Booking.com. "When we started exploring our next compute generation around 2023, we were focused on reducing carbon emissions. Efficiency was the main metric."

This was a complex requirement. "We wanted to consolidate and make our infrastructure more power efficient," says Rasing. "At the time energy pricing was high. It was a different landscape where not only could we realize sustainability benefits but also reduce TCO by lowering power OpEx."

However, reducing energy consumption must be balanced against maintaining performance. Booking.com's exceptional customer experience relies on a host of demanding workloads. "What you see when you make a booking on the website is an in-memory database," says Peter Buschman, Principal Engineer, Booking.com. "A variety of frontend applications are stitched together. There's MySQL databases, NGINX web servers, Kafka queues, and Cassandra key value stores. Their datasets run resident in RAM.

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>
> Jurriën Rasing, Senior Product Manager, Booking.com

CHOOSING POWER EFFICIENCY OVER COST

"Before the drop in demand during the pandemic, our main concern was how much compute we could get for a reasonable cost," continues Rasing. "But as demand returned, we shifted to efficiency. Our typical servers had combined 16 cores with 128GB of memory, which our internal platform team customers deployed as a service. We built bare metal and made it available through a portal for automated provisioning. Our customers were consuming thousands of relatively small servers."

INDUSTRY
Online travel retail

CHALLENGES
Cut energy use and costs while maintaining performance, scaling infrastructure, and meeting ambitious sustainability goals.

SOLUTION
Deploy 4th Gen AMD EPYC™ 9474 Server processors, consolidating workloads, boosting efficiency, enabling virtualization, and reducing power consumption.

RESULTS
Power efficiency improved by 70%, energy use cut by 16.3 million kWh annually, costs reduced by nearly 50%, and halved data center space, giving customers six times the server resources.

AMD TECHNOLOGY AT A GLANCE
4th Gen AMD EPYC™ 9474F Server CPUs

"We wanted to do it differently with our new infrastructure," adds Rasing. Instead of asking vendors for ten different options ranked by cost, Booking.com asked for them ranked by power efficiency. "EPYC CPUs were top of the list. We tested eight different configurations, four CPUs from AMD and four from another vendor. We tested real-life performance, power consumption, and cost. The AMD EPYC™ Server CPU that we chose at scale is the one that came on top by a large margin."

> **"All the AMD EPYC Server CPUs were significantly above the competition for performance per core per watt."**
> Jurriën Rasing, Senior Product Manager, Booking.com

The company performed its own benchmarks on its server hardware candidates. "We used Phoronix test suite," says Rasing. "We were mainly looking at the power consumption per core and then normalizing for performance. If you have a very high-performance core with a fast core frequency, that justifies more power. All the AMD EPYC Server CPUs were significantly above the competition for performance per core per watt."

The upgrade meant customers had six times the server resources they were used to. "Some workloads can easily scale to that level, but others weren't using the CPU very efficiently, so we started building virtualization on top to provide VMs rather than the full CPU," says Rasing. "Initially, we were doing a like-for-like replacement and trying to consolidate workloads to between four and 10 to one ratio from one box to another."

AMD EPYC SERVER CPUS CUT TCO IN HALF

"We didn't explicitly buy those machines with the goal of virtualizing them," says Buschman. "But we've hit a nice middle ground. We can carve resources up into enough pieces to get some very dense and efficient virtual machine layouts."



Booking.com chose AMD EPYC Server CPUs to improve power efficiency while maintaining the performance its applications demand.

One of the goals of Booking.com's compute strategy for the 2024-2030 period was to increase power efficiency by reducing server watts per core, aiming for a 100% improvement in 2030 versus 2023. So far, thanks to deploying 4th Gen AMD EPYC Server CPUs, the company has already achieved a 70% increase in efficiency, requiring 4.84 versus 8.25 watts per core. This has helped lower total cost of ownership by 49.54%, realizing a power consumption reduction of 16.3 million kWh per year.

This accomplishment has delivered huge benefits. "We can achieve the same performance, but with half the physical data center footprint and significantly less energy consumption," says Rasing. "Up until the pandemic we always increased the compute quantity, which meant more data center footprint. But when we started this initiative, it was the first time in our history we could reverse the power curve. We were so confident in our modernization strategy that we could comfortably go to the data center teams and say we needed less."

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> Jurriën Rasing, Senior Product Manager, Booking.com

"It also allows us to adjust the resources our customers need," says Buschman. "With the transition to AMD, we have a single universal definition of a CPU and that's EPYC 4th Gen. Prior to that, we had a mixture of a high clock speed part that ran the single threaded code and a low clock speed part that ran everything else. We would buy about one-third of the former and two-thirds of the latter. Now a single AMD Server CPU does everything. You don't have to think about the ratios you're deploying because the entire compute farm is homogenous. Virtualization and the number of cores in a chassis mean we can create new server configurations with any combination of cores, memory and storage that a customer requires."

AMD TICKS ALL THE BOXES

Now Booking.com can match server specification to application need. "We've changed some of our default settings so the most frequent configuration has a quarter of the storage and half the memory that would previously have been the lowest common denominator," says Buschman. "For a lot of standard workloads, we were providing too many resources because we focused on the average for the entire compute fleet. Now we can selectively size those workloads by getting our customers to adopt smaller virtual instances."

"Now 60% of our infrastructure is AMD," says Rasing. "It will be 80% by the end of the year and over 90% by the end of next year. We have several thousand dual-socket servers."

> **"AMD is a clear success story exceeding our expectations."**
>
> Peter Buschman, Principal Engineer, Booking.com

"We almost exclusively use the high frequency 4th Gen AMD EPYC™ 9474F Server CPU," says Buschman. "It sits at that sweet spot with less than 50% of the maximum AMD EPYC CPU core density, but a maximum clock rate per core that provides the best balance."

"Our current strategy is to be flexible on the life cycle of our hardware," says Rasing. "Energy was expensive and servers were less expensive, now it's the reverse. We are waiting for 6th Gen to do more testing. We want to make a shift from dual socket with the current CPUs to single socket. With 6th Gen, we think we can achieve that because we can get the same number of cores or more with the same performance on a single socket. We would get the next level of power efficiency."

"Hands down, I would totally recommend AMD as a CPU vendor," says Buschman. "The EPYC CPU compute efficiency and workload elasticity ticks all the boxes. AMD is one of the few vendors where I'm comfortable buying at scale without doing exhaustive application tests. AMD is a clear success story exceeding our expectations."



With AMD EPYC Server CPUs, Booking.com consolidates workloads and uses virtualization to allocate compute resources more efficiently.

WANT TO LEARN HOW AMD EPYC SERVER CPUs MIGHT WORK FOR YOU?
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ABOUT AMD

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