

Hetzner offers cloud service with compelling performance at a low price

One of the leading German cloud service providers (CSP), Hetzner, aims to offer low prices and impressive performance. It built its new cloud service on Intel® processors, networking, and storage technologies.

At a Glance:

- Hetzner planned to introduce a new cloud service, with more flexibility than its existing Virtual Private Server (VPS) service.
- It was looking for technologies that could cost-effectively deliver impressive performance across compute, storage and networking.
- 2nd generation Intel® Xeon® Gold processors offered the performance Hetzner needed, and compatibility with previous processor generations used for hosting virtual machines (VMs).
- The Intel® Ethernet 700 Series provides a 10-gigabit uplink option, compatibility with VMware software, and Virtual Extensible Local Area Network (VxLAN) offloading to optimize communications between VMs.
- The Intel® SSD DC P4510 Series brought the speed of Non-Volatile Memory Express (NVMe), with consistent performance, and a low failure rate.
- Hetzner works closely with Intel to launch new technologies and cut its time to market.

The market for cloud services is highly competitive. To break through with its new budget service for small- and medium-sized businesses, Hetzner realized it would have to offer not only cost savings, but also great performance. It based its architecture on the Intel® Xeon® Gold processor, Intel® Ethernet 700 Series for networking, and Intel® SSD DC P4510 Series for storage.

Challenge

Hetzner wanted to differentiate its new cloud service on both price and performance. It needed compute, storage and networking components that would deliver impressive performance for customers, at a cost-effective price point.

Solution

The 2nd generation Intel® Xeon® Gold processor delivers the processing performance Hetzner needs, with the Intel Ethernet 700 Series delivering network performance and Virtual Extensible Local Area Network (VxLAN) offloading. The Intel SSD DC P4510 Series brings the performance of Non-Volatile Memory Express (NVMe).

Results

Hetzner says its new cloud service has made a big impact on the market, and it won the gold award at the Hosting and Service Provider Awards.

Business Challenge

With small- and medium-sized businesses in its sights, Hetzner strives to provide good value hosting solutions. "The cornerstone of Hetzner is that we aim to give customers the best bang for their buck," says Markus Schade, Head of the Cloud Service Division, Hetzner. "For a given price point, we want to offer the highest specification service that is commercially feasible."

The company was established in 1997 in Germany, and is well known for providing dedicated servers and virtual private servers (VPS). For the next step in its evolution, the company wanted to offer what it considered to be a true cloud service. "Even though we have been offering VPS and virtual machines (VMs) for ten years, we didn't feel they warranted the label 'cloud'," says Schade. "The VPS services were based on monthly billing, and we wanted to offer hourly billing and the greater flexibility of a true cloud offering."

This would make Hetzner attractive for many new applications and use cases. "We didn't have a fixed contract period, but billing by the month was too long a

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period for continuous integration/continuous deployment (CI/CD) use. The whole lifecycle of spinning up an instance, compiling, testing, and then destroying the instance might only take an hour or two. Additionally, customers for our dedicated business might want extra resources on demand for peak workloads, or just a small outside instance for monitoring their dedicated servers. By offering a more flexible on-demand cloud service, we could make our platform more attractive to existing customers, and more competitive for winning new business."

The market for on-demand cloud hosting is already heavily contested and fiercely competitive. "If you want to make an entrance in an already crowded market, you need to provide a compelling reason for customers to switch to your platform," says Schade. "We looked at our competitors and what they offered at a given price point, and we wanted to make ours more attractive by offering more memory, cores and storage."

To launch its cloud platform, Hetzner needed cost-effective technologies for compute, storage and networking that would deliver impressive levels of performance.

Solution Details

Hetzner launched its cloud service in 2018 based on the then-latest Intel Xeon Gold processors. The company has now upgraded to the 2nd generation Intel Xeon Gold processors. "When we launched the cloud platform, we marketed that it was running with Intel Xeon Gold processors, which had a good name in the marketplace," says Schade. "A lot of our competitors just advertised that you get one, two or three virtual CPUs without telling you what kinds of CPU you would get. We always tell you what you're getting."

"When we started looking for hardware for the cloud platform, we knew we needed to be able to run a certain number of VMs to be cost effective," says Schade. "The number of instances you stack on a physical server affects how much memory you need to put in, the amount of CPU resource you need, and how much network you need. We juggled the numbers to ensure we chose CPUs that would enable us to run the number of instances we wanted to cost-effectively. It's about rightsizing the physical machine to the virtual products we wanted to offer."

It was important for the CPU to be backwards-compatible with those used for the VPS service, which was using four previous generations of Intel® architecture. The dedicated hosting service had introduced these CPU generations when they were the state of the art. Over time, they fell out of favor with dedicated server customers, because newer processors offered improved performance. The VPS service was based on excess hardware from the dedicated server offering. "There was a wide range of servers that we used interchangeably for VPS," says Schade. "To be able to migrate workloads back and forth, we used the oldest VM type from 2011 as a common model. We wanted to enable customers to move their older instance types to the new cloud platform so they could benefit from the latest features and security updates. But we wanted to do that without them having to change what they're running."

Now, the older VPS instances have been integrated in the new cloud offering so customers can use the new cloud user interface, and benefit from pay-per-use pricing. Billing

is based on the hour, with a rebate if customers keep an instance for a whole month. To use additional features in the cloud platform, customers can upgrade to a cloud-native instance without losing any data.

Hetzner also chooses Intel components for its networking. "The Intel Ethernet 700 Series is the network card of choice for our cloud platform," says Schade. Customers opting for a 10-gigabit uplink option are provided with the Intel Ethernet 700 Series. "Customers love this option," says Schade. "These network cards are so well supported. A lot of customers are using VMware solutions for virtualization. By using Intel network cards on a Dell server, our customers can get a fully certified system, with support available from VMware too."

The Intel Ethernet 700 Series also supports VxLAN offloading. "We offer virtual private networks in our cloud platform. Customers can use them to connect their VMs to run database replication or communication between front and back-end servers, for example. If the host hypervisor has to encapsulate and break out the packets going between VMs, that consumes CPU resources. Using VxLAN offloading on the network card frees up the CPU for the VMs."

The storage in the cloud service is based on the Intel SSD DC P4510 Series. At the time, competitors were mostly using SATA drives and the Intel SSDs enabled Hetzner to offer NVMe. Schade says: "Customers would look at our offering and say, 'Wow! Not only are we getting the latest CPUs, but we're also getting NVMe speeds for storage!'"

He adds: "We have found the Intel SSD DC P4510 Series performs consistently well, offers NVMe speeds at a competitive price point, and with a low failure rate."

The SSDs are arranged using a Redundant Array of Independent Disks (RAID) 10 configuration to provide even higher speeds than a single NVMe drive.

Hetzner is evaluating how the Data Plane Development Kit (DPDK) and Storage Performance Development Kit (SPDK) can be used to improve the performance of its networking and storage.

Connecting the Dedicated Servers

In its dedicated servers, Hetzner uses Intel® Ethernet Connection I219 Series, Intel® Ethernet Controller I210 Series, and Intel® Ethernet Server Adapter I350 to provide 1GbE uplink. "They offer great stability, and support a wide range of feature sets, including multiple network queues, which are used by our customers in virtualization," says Schade. "We have found them to be way better than other offerings at a lower price, with really good driver support in Linux."

He adds: "We offer a range of standard operating system images, but it's only a small selection of what is available. In our experience, customers will run all kinds of operating systems. We prefer using Intel network cards because they're well supported by nearly all operating systems out there. We've seen all kinds of problems with drivers for alternative hardware in different operating systems."

Dedicated servers can also use the Intel Ethernet 700 Series for internal communications, with the Intel Ethernet Server Adapter I350 used for uplink if customers don't need 10GbE for the uplink.

Technical Components of Cloud Solution

- **2nd generation Intel® Xeon® Gold processor.** The Intel® Xeon® Scalable processor family, including the Intel® Xeon® Gold processor, is designed for data center modernization. It aims to drive operational efficiencies that lead to improved total cost of ownership (TCO) and higher productivity for users. Systems built on the Intel Xeon Scalable processor family are designed to deliver agile services with enhanced performance and groundbreaking capabilities, compared to the prior generation.
- **Intel® SSD DC P4510 Series.** Packed with a deep feature set, this cloud-inspired Intel® 3D NAND SSD is optimized for cloud infrastructures, offering outstanding quality, reliability, and advanced manageability and serviceability, to minimize service disruptions.
- **Intel® Ethernet 700 Series.** These Ethernet Network Adapters help to accelerate the delivery of new services and capabilities through intelligent offloads, sophisticated packet processing, and quality open-source drivers.

Accelerating Time to Market

Working closely with Intel enables Hetzner to introduce new technologies more quickly. “We get access to Intel’s resources and roadmaps of upcoming products,” says Schade. “We can see whether something would be attractive to our customer base, and ask for samples to start developing services early. Ideally, we can offer the product when the platform launches or at least as soon afterward as possible. Being early to market enables us to have the latest technologies available for the longest time.”

“I have to commend Intel for making such an effort to get support for all their new technologies and platforms into open source,” says Schade. “When a new hardware platform is released, we can often run it already and make use of most of the features. That’s tremendously helpful in adopting new technology.”

A Successful Launch

Hetzner Cloud has launched successfully, and has won the gold award at the Hosting and Service Provider Awards, based on responses to a large reader survey conducted by Vogel IT-Medien.

“Working with Intel and using Intel products across the board for compute, storage and networking has allowed us to offer a high-performance cloud platform with extremely competitive pricing. It has entered the market with a big impact,” says Schade.

Spotlight on Hetzner

Hetzner is a professional web hosting provider and experienced data center operator. Since 1997 the company has provided private and business clients with high-performance hosting products as well as the necessary infrastructure for the efficient operation of websites. A combination of stable technology, attractive pricing and flexible support and services has enabled Hetzner to continuously strengthen its market position both nationally and internationally. The company owns several data centers in Germany and Finland.

www.hetzner.com

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- **2nd generation Intel® Xeon® Gold processor**
- **Intel® SSD DC P4510 Series**
- **Intel® Ethernet 700 Series**

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