CASE STUDY

Service Providers
Data Center

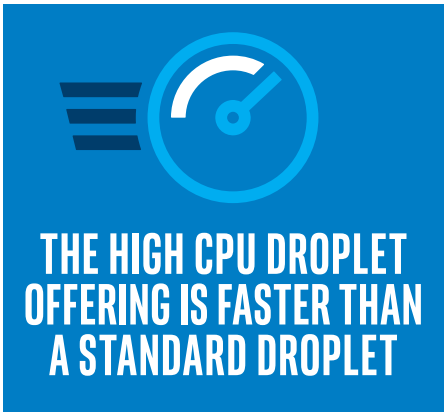
DigitalOcean Chooses Next-Gen Intel® Processor for its Compute-Intensive Platform

In close collaboration with Intel, DigitalOcean launched an offering, based on the Intel® Xeon® Platinum 8168 processor, that is optimized for compute-intensive analytics workloads

At a Glance:

- DigitalOcean worked with Intel to quickly launch a service for customers with significant compute requirements who wanted CPU optimized cloud servers that were reliable, consistent, highly performant and affordable
- The Intel® Xeon® Platinum 8168 processor features hardware-based technologies that deliver real-time responsiveness and excellent performance for demanding scale-up workloads
- Intel engineers helped optimize platform performance and assisted with specific marketing efforts

DigitalOcean



Intensely competitive, cloud platform providers jostle one another in the marketplace, striving to be the one to launch the most recent, most innovative and most affordable cloud service. DigitalOcean, founded in 2012, originally offered virtual machines (called Droplets) that provide a healthy balance of CPU, RAM and local solid state drive (SSD) resources to developers, along with a simple and intuitive provisioning and management interface. DigitalOcean moved on to release eight new offerings over a period of 18 months, one of which was a High CPU Droplet, built on the Intel® Xeon® Platinum 8168 processor. The new service could handle the most demanding analytics compute loads and it helped DigitalOcean significantly grow its market share.

Challenge

- Provide an easy-to-use yet powerful platform to customers who want to run compute-intensive workloads
- Bring a new, industry-leading service to market quickly to grow the business and offer both new and existing customers the DigitalOcean experience they expect

Solution

- Intel and DigitalOcean collaborated to define and launch new cloud services, based on the Intel Xeon Platinum 8168 processor, that are powerful enough for developers running workloads that require access to newer and higher-performing CPUs
- DigitalOcean chose the Intel® SSD DC S3520 Series to help avoid costly disk failures and loss of data
- Intel engineers supported DigitalOcean by assisting with technical optimizations and participating in targeted joint marketing efforts

Results

- Working closely with Intel, DigitalOcean launched an intuitive yet powerful High CPU Droplet* offering, taking it from concept to production in less than six months
- Virtual machines and containers based on the Intel Xeon Platinum 8168 processor provide industry-leading performance for workloads with high compute demands

- DigitalOcean benefits from enhanced scalability and optimized price-per-performance while maintaining ease of use
- DigitalOcean's customers benefit from running their workloads on Intel's reliable, robust, high performance

Meeting the Surge in Demand for Compute Power

DigitalOcean is a cloud platform for developers and their teams. With over 150 businesses on DigitalOcean, the New York-based company has come a long way since its founding in 2012. Its core product is a Standard Droplet*, which is a KVM/QEMU instance on an SSD-based server. The company's focus on fast, simple Droplet provisioning (within 55 seconds, generally) is popular with developers – so much so that by 2015, DigitalOcean became the second largest hosting provider in the world. At the same time, both large and small cloud platform providers are fiercely competing for market share.

To increase its competitiveness and grow revenue, DigitalOcean launched multiple new services in 2017, such as scalable firewalls and monitoring services, High-Memory and High-CPU Droplets*, load balancers, block storage and object storage. But neither the High-Memory Droplet nor the Standard Droplet met the needs of developers who require access to newer and higher-performing CPUs for heavy workloads. According to Gartner, increasingly compute-intensive workloads are a significant driver of cloud platform providers' revenue, and DigitalOcean wanted to be able to attract developers running these types of applications.

Introducing the High CPU Droplet

DigitalOcean collaborated with Intel to design and deploy a new High CPU Droplet (also referred to as an Optimized Droplet*), which features the Intel Xeon Platinum 8168 processor. DigitalOcean chose this processor as the foundation of the new service based on its rich feature set and high performance. By using this processor, the company can increase the number of Droplets per server, which lowers price-per-performance while boosting the ability to run compute-intensive workloads, such as analytics. DigitalOcean has also standardized its data centers on the 40 GbE model of the Intel® Ethernet Converged Network Adapter.

Future plans at DigitalOcean include boosting the performance of Standard Droplets by upgrading from the Intel® Xeon® processor E5-2650 v4 to the Intel® Xeon® Gold 6140 processor. The company also anticipates adding the 25 GbE model of the Intel Ethernet Converged Network Adapter, which will enable them to take better advantage of their network capacity.

High CPU Droplets are specifically designed to handle computationally intensive workloads. They have smaller proportions of RAM and local SSDs relative to Standard Droplets but run on top of compute-optimized hardware separate from Standard Droplets. Customers can choose from a variety of High CPU Droplet sizes:

- Memory ranges from 4 GB to 64 GB
- Number of vCPUs ranges from 2 to 32
- SSD capacity ranges from 25 GB to 400 GB

Additionally, High CPU Droplets are engineered to have dedicated underlying physical resources so that other guests on the same hardware very rarely impact another Droplet's performance. Each vCPU on a High CPU Droplet maps directly to a dedicated hyper-thread on the underlying physical CPU.

> "We designed this offering for compute-intensive applications that require the highest levels of CPU performance and reliability. They offer maximum access to powerful CPU resources and ideal support for applications such as ad exchanges, game servers, highly active front-end application servers and queue/batch processing."
>
> **—Shiven Ramji**
> VP, Product, DigitalOcean

Technical Components of the Solution

- Intel® Xeon® Platinum 8168 processor. The new Intel® Xeon® processor Scalable family represents the latest evolutionary leap forward in disruptive data center design for cloud service providers (CSPs), with significant platform innovations across compute, storage and network infrastructure to accelerate service delivery and efficiency.
- Intel® Solid State Drive (Intel® SSD) DC S3520 Series. These SSDs provide an ideal balance of endurance and performance, enabling data centers to increase data stored per rack unit and decrease the risk of disk failure. A new SATA-designed controller delivers the convergence of scalable capacity and manageability.
- Intel® Ethernet Converged Network Adapter XL710. This 40 GbE adapter is the foundation for server connectivity, providing broad interoperability, critical performance optimizations and increased agility for cloud services.

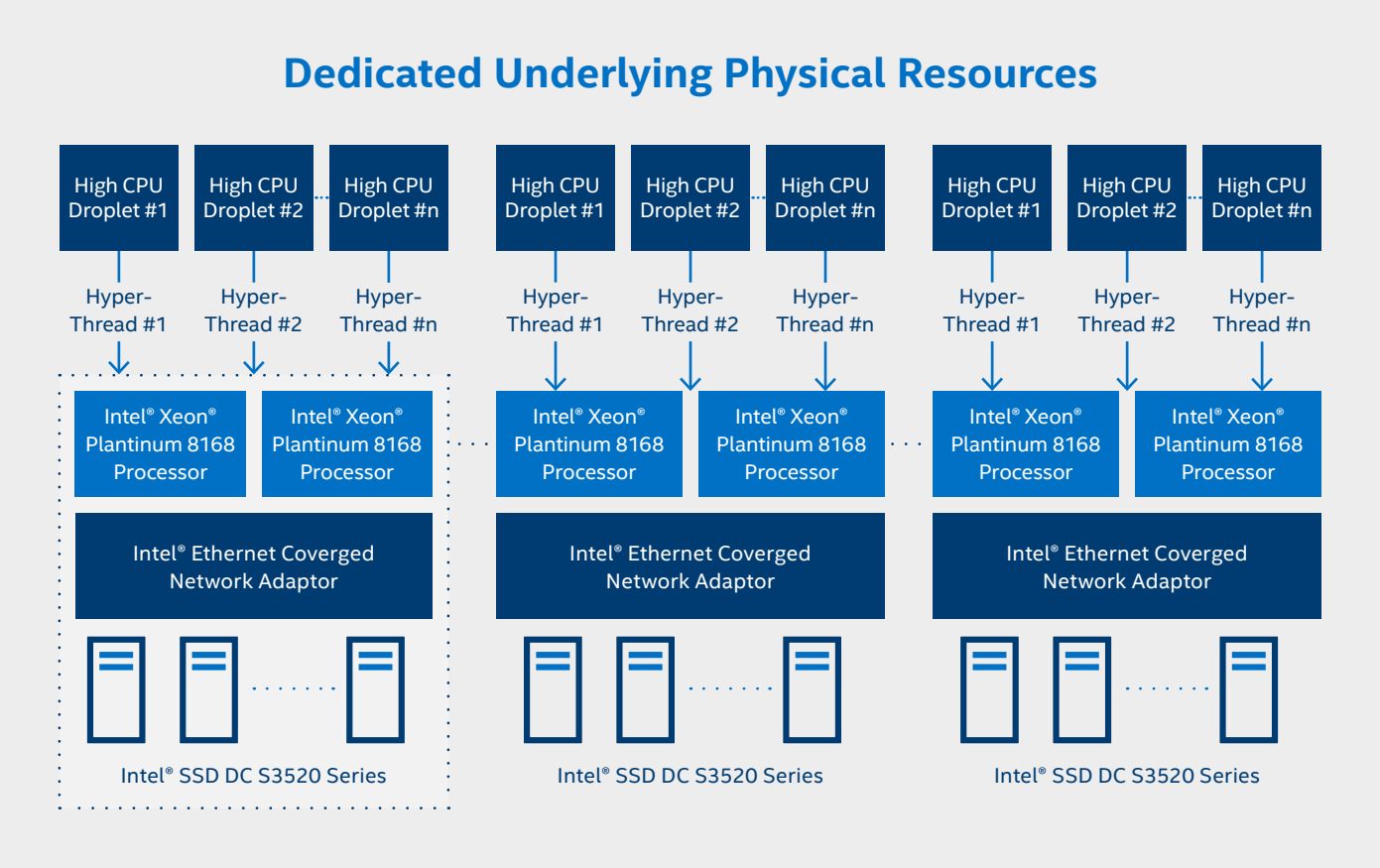


Figure 1. The solution architecture for the High CPU Droplet

Early Adoption of Intel® Technology Accelerates Competitive Advantage

By basing the High CPU Droplet on the latest generation of Intel® processor, SSD, and Ethernet technology, DigitalOcean was able to gain significant advantage over its competitors, offering something that was not previously available in this highly competitive market.

Intel sales representatives and engineers provided considerable support during the project. For example, the Intel account team and the supporting Intel product team helped DigitalOcean with pricing, TCO, ROI and business justification of why the Intel Xeon Platinum 8168 processor was the best choice for High CPU Droplets. Intel engineers assisted with several technical optimizations such as best practices for NUMA affinity and NUMA clustering on KVM and how to pin threads to avoid KVM steal. As the new offering neared deployment, the Intel team helped the OEM expedite its validation process, and participated in some joint marketing efforts, such as launching the High CPU Droplet offering on the same day as Intel launched the Intel Xeon processor Scalable family.

Collaboration Raises All Boats

DigitalOcean's "DO-simple" approach to provisioning and managing cloud servers (Droplets) simplifies cloud computing so developers and their teams can spend more time building software that changes the world. Intel® technology, such as the Intel Xeon processor Scalable family, SSDs, and fast, reliable Ethernet connectivity, makes that underlying infrastructure highly suited for compute-intensive workloads such as analytics. DigitalOcean's testing reveals that a High CPU Droplet can increase vCPU performance compared to Standard Droplets. The increased core count and memory capacity of the latest generation of Intel Xeon Scalable processor lets DigitalOcean deliver scalability and optimized price-per-performance.

The collaboration between Intel and DigitalOcean resulted in a powerful yet easy-to-use service. Development took less than six months. In DigitalOcean's data centers, virtual machines based on the Intel Xeon Platinum 8168 processor provide industry-leading performance for workloads with high compute demands. Intel and DigitalOcean are looking forward to further collaboration to put the best of Intel technology to work for DigitalOcean's customers.

Spotlight on DigitalOcean

Founded in 2012, with offices in New York and Cambridge, MA, DigitalOcean provides one of the easiest cloud platform to deploy, manage, and scale applications of any size, removing infrastructure friction and providing predictability so developers and their teams can spend more time building software that customers love. The company offers simple services and transparent pricing and is always thinking of ways to make developers' lives easier, including an intuitive interface and flexible API, a robust set of features, thousands of tutorials, and one of the largest libraries of open source resources available.

Learn More

- Overview of DigitalOcean Droplet offerings
- Intel® Xeon® processor Scalable family
- Intel® SSD DC S3520 Series
- Intel® Ethernet Converged Network Adapters

Lessons Learned

The key lessons that cloud platform providers can learn from DigitalOcean's experience are:

- Upgrading to a newer generation of Intel® Xeon® processor can improve computational performance and price-per-performance
- The Intel® Xeon® Scalable processor platform provides cost-efficient performance for compute-intensive workloads, such as analytics
- By collaborating with Intel, cloud platform providers can quickly adopt new technologies and take advantage of Intel's engineering expertise for optimizing platform design and software performance

Find the solution that is right for your organization. Contact your Intel representative or visit **intel.com/cloud**

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