Case Study

Zenlayer Edge Cloud Services

Accelerating Edge Cloud Services and Real-Time Digital Experiences with Lightbits and Intel

Lightbits SDS running on Intel high-performance technologies enable fast, more secure, multi-tenant edge cloud services for Zenlayer that are easier to manage and more cost-efficient.

Edge cloud made easy

Zenlayer also reaps technical benefits through its integration with Lightbits, such as:

- A disaggregated fail-in-place architecture
- Simplicity of NVMe/TCP while delivering high IOPs and low latency
- Better flash utilization
- Multitenancy within the existing network stack
- Fast provisioning of IOPS capacity for each application server
- Flexibility to integrate with future infrastructure technologies
- Highest IOPS of any solution tested
- Elimination of the stranded capacity problem present in DAS deployments
- Per tenant Quality of Service (QoS)

Connecting global users with high-performance edge cloud

Zenlayer offers on-demand edge cloud services in over 290 PoPs around the world, with expertise in fast-growing emerging markets. Their mission is to enable real-time digital experiences anywhere, instantly. Customers use Zenlayer's edge cloud to deploy infrastructure and services on a global scale, accelerate applications running at the edge, enable application interactivity and communication between users, and improve digital experiences with cloud agility. Zenlayer's edge cloud affords them the ability to reach 85% of the world's internet users in under 25 milliseconds.[1]

To date there are more than 100 applications running on the Zenlayer platform. Customers include gaming companies, blockchain companies, 5G providers, content delivery networks (CDNs), financial services, any business that needs data reliability, ultra-high performance, and ultra-low latency.

The challenge

Organizations are currently adopting cloud computing at breakneck speed, and Zenlayer believes the edge cloud is the new higher performance cloud. As a leading edge cloud provider, they strive to provide high performance cloud services, while balancing costs, privacy and data sovereignty. Zenlayer's goals were to move away from their legacy Direct Attached Storage (DAS) architecture which had proved difficult to scale in response to customer demand and create a robust, high performing, and secure offering for customers that made storage and data services easy to provision. And they needed an architecture that protected against potential hard-drive failures so that their customers' experience was not interrupted. Equally important, the platform had to be cost-efficient and easy to manage to improve their margins, and flexible enough to integrate with any hardware technologies they choose in the future.

In addition, Zenlayer wanted to satisfy their customers' desire to retain control of their own applications. Zenlayer defined the solution requirements to include:

- High performance and ultra-low latency
- Enterprise data services with easy, scalable provisioning
- Cost-efficient and easy to manage
- Compatible with many orchestration environments (VMs and containers)
- Multi-Tenant
- Flexibility to adapt to their changing infrastructure architecture

This multifaceted challenge led Zenlayer to explore several service providers to find the right combination of technologies.

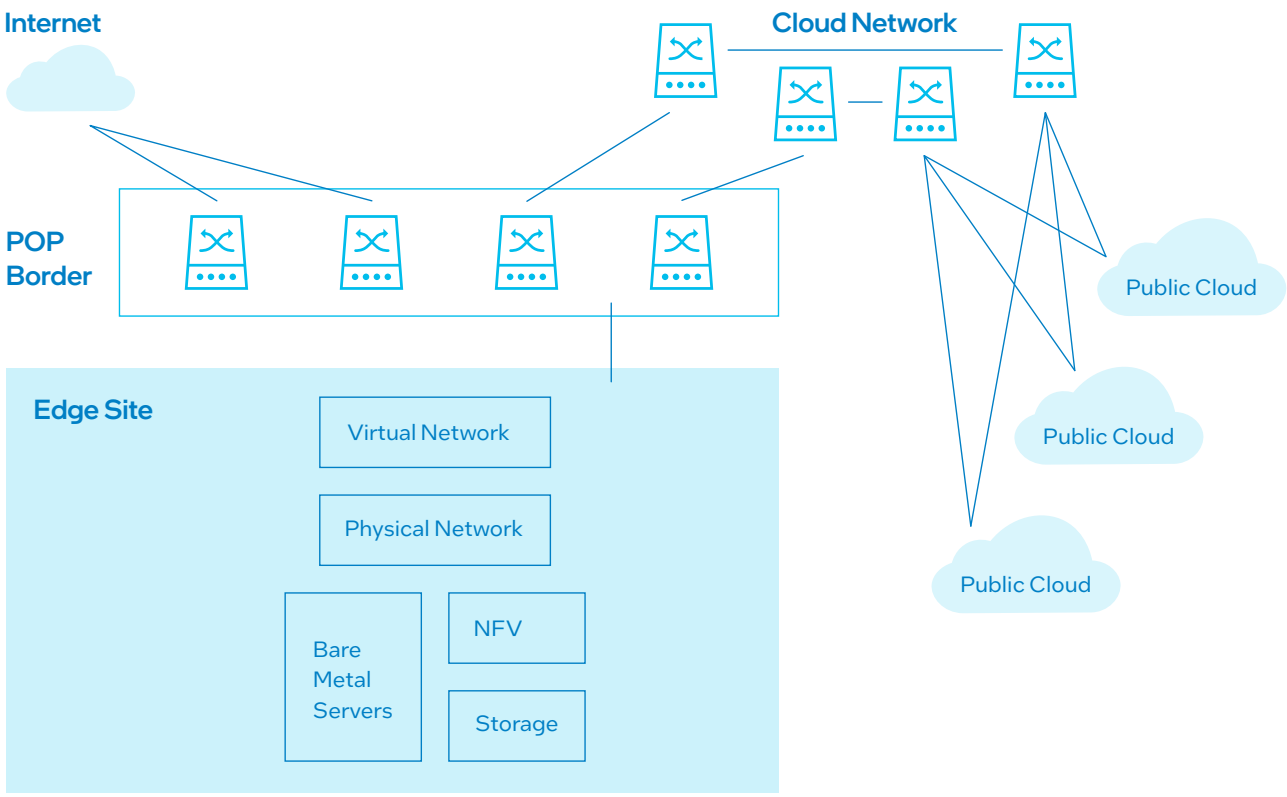
Solution

Zenlayer's exploration led them to Lightbits. The simple, efficient, and agile software-defined, high performance cloud data storage solved all of their requirements. The combination of Lightbits software with Intel's high-performance technologies solved Zenlayer's infrastructure challenges enabling ultra-low latency disaggregated storage and on-demand worldwide NVMe as a Service, while reducing management costs by 20%.[2] The Zenlayer Edge Cloud is powered by the Lightbits Cloud Data Platform in a bare metal environment on Supermicro SuperServers and accelerated by a wide range of Intel hardware, including the following:

3rd Generation Intel® Xeon® Scalable processors: 3rd Generation Intel Xeon Scalable processors offer high performance and acceleration, are storage-software optimized, and include Intel Volume Management Device (Intel VMD) and enterprise-class SSD hot-plug capabilities.

Intel® Optane™ persistent memory (PMem): Intel Optane PMem more than doubles the capacity of typical DDR4 DRAM DIMMs, which can help significantly lower TCO by increasing the utility of each server. Intel Optane PMem also expands the memory pool that resolves high input/output (I/O) bottlenecks by keeping data readily accessible in the memory tier to meet the Cloud Native high-capacity data center demands as future needs grow. Lightbits Intelligent Flash Management utilizes Intel Optane PMem modules as a write buffer that extends NVMe flash endurance.

Intel Ethernet 800 Series with Application Device Queues (ADQ) technology: ADQ technology enables NVMe over Fabrics (NVMe-oF)/TCP to achieve distributed storage performance in the same range as RDMA-based protocols, while NVMe-oF/TCP enables broad adoption because of its ease of deployment and scalability.



Zenlayer's Edge Cloud is composed of virtualized Bare Metal Servers using container orchestration system.

The solution is part of an Ethernet Virtual Private Network (EVPN) for multi-tenant isolation. The Zenlayer Edge Cloud is composed of bare metal servers, VMs, and containers, and offers premium services with high density computing capacity, high performance storage, ultra-low network latency to local regions, and can also enable service integrations with public clouds.

Lightbits storage makes the difference

During their evaluation period, Zenlayer engineers compared the Lightbits, software-defined and architected for NVMe/TCP cloud data platform, to other storage solutions such as RDMA over Converged Ethernet (RoCE) and Internet Small Computer System Interface (iSCSI). Findings showed Lightbits has equivalent or better performance and is easier to implement. Using Lightbits instead of RoCE enabled Zenlayer to avoid having to implement their own dedicated fabric, which would have increased their cost significantly.

Lightbits invented the NVMe over TCP (NVMe/TCP) standard. It's simple, flexible, and easy to deploy at scale on ubiquitous TCP/IP networks, requiring no special hardware, NICs, drivers, or hypervisor on the storage nodes—simplifying storage for cloud implementations on bare metal, VMware, and Kubernetes environments. The native NMVe/TCP and clustered architecture, coupled with Innovative Intelligent Flash Management, eliminates the storage complexities and high-costs associated with cloud-scale computing. Lightbits an ideal block-based storage solution for edge clouds, delivering millions of IOPS and lower latency. It's simpler to implement and requires less deployment of management resources.

Another key differentiator that made Lightbits stand out from the competition: a fully automated, API-driven, flexible, and easy-to-use deployment model for provisioning customer environments. Zenlayer's customers retain complete control of their applications. And the disaggregated architecture provides the flexibility they need to immediately respond to changing customer demands for capacity and performance. Customers are also assured that their data is more secure with dual [or triple] replication enabled for business continuity in the event of a failure.

These factors made Lightbits the primary choice for Zenlayer's edge cloud requirements.

A vision realized

By choosing to integrate Lightbits software accelerated by Intel technologies into their Bare Metal Cloud (BMC) offering, Zenlayer can now offer an edge cloud service with the highest end-to-end performance, security, and elasticity. Zenlayer can serve their customers easier and with less management involvement, and with an NVMe/TCP architecture deliver a high performance with ultra low latency platform. The ability to use simple API calls to provision storage and data services aligned to Zenlayer's requirements and reduces systems management stress for the Zenlayer team while delivering reliable, secure, fast storage for customers.

Zenlayer customers also benefit from the solution with better application interactivity and communication between users. Customers can connect directly to their servers in multiple regions and public clouds for a completely interconnected solution. They also benefit from a lower total cost of ownership (TCO) by eliminating the stranded capacity problem present in DAS deployments, robust business continuity, and the ability to scale easily due to fast, dynamic provisioning.

"Our integration with Intel and Lightbits enables us to service our customers better and realize our mission. We have built an end-to-end high performance edge cloud with strong security and elasticity, with much less management overhead and stress. With demand for edge cloud services growing, this partnership allows us to deliver the service our customers need in the most cost-effective fashion."

– Jim Xu, Zenlayer Principal Engineer

Quick Highlights:

- Zenlayer reduced storage management costs by 20%.
- Integration delivers high-performance, low latency edge cloud services.
- Customers can run global storage and retain control of applications.
- Zenlayer can offer multitenancy using its existing network stack.
- Millions of IOPS offer faster data analysis/management at the edge.
- Simplified provisioning and management reduces management overhead and stress.
- Per tenant Quality of Service (QoS)

Zenlayer can now offer reliable, high-performance volume services to their customers that are dynamically adjustable and offer all the flexibility of the cloud, but with greater efficiencies and rich enterprise data services.

To get started contact your Lightbits or Intel representative today.

For more information on Lightbits: www.lightbitslabs.com

For more information on Zenlayer Bare Metal Cloud: www.zenlayer.com

For more information on Intel: www.intel.com

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1 - https://www.zenlayer.com
2 - Source: Zenlayer internal measurements.