

Lightbits Powers 2M+ Kubernetes CPU Cores for One of the World's Largest eCommerce Platforms

For architects of e-commerce platforms, building a system for performance, efficiency, flexibility and reliability is paramount. Here the data platform is not just a functional necessity but a strategic asset that can drive business growth and scale. Storage plays a significant role in enabling real-time analytics, transactional and AI workloads that empower online retail businesses to monetize their data, transform operations and deliver superior customer digital experiences. Latency, measured in microseconds, is the enemy. Poor performance can result in hundreds of thousands of dollars in lost transactions and abandoned shopping carts. Storage must be reliable and highly performant, even during fluctuating demand; events like Black Friday or unexpected social media trends can put a heavy load on data systems. The challenge for platform architects is to achieve scale and flexibility without compromising application and site performance.

Lightbits has the solution, offering scalable high performance, consistent low latency, and predictable low costs, it's an ideal data platform for eCommerce. By disaggregating servers and storage, Lightbits ensures performance, reliability and availability during peak workload demand without over-provisioning—and overpaying—for resources. Lightbits is a fast, efficient and flexible storage platform that can scale in step with demand while keeping storage costs from skyrocketing.

THE CHALLENGE

This massive, multi-billion dollar online retailer, with many million products in as many different categories, commands the largest share of market in their region. The platform currently services millions of registered users, millions of daily visits, and delivers millions of shipments per month – and those numbers increase exponentially every year. To support their massive growth and compete on a global scale, the company sought to modernize their data platform for flexibility and efficiency.

The organization was looking to move from their JBOD (Just a Bunch of Disks) and JBOF (Just a Bunch of Flash) design to a fully disaggregated, software-defined, Ethernet-based infrastructure. The new system had to support their Kubernetes (K8s) environment that consists of thousands of worker nodes on bare metal across multiple data centers. In their K8s environment, they run many high-performance database, analytics and streaming applications including MySQL, MongoDB, Kafka, Cassandra, Aerospike, Hbase, Redis, TidyDB, Postgres, Elasticsearch, Apache Pulsar and others. Business problems that triggered the modernization initiative included:

- Poor storage efficiency and utilization stemming from DAS and JBOD system design
- Expensive to scale
- Poor performance for their IO-intense database workloads in a highly dense K8s environment
- Inability to allocate storage resources when and where they were needed

Industry

eCommerce

Workloads & Use Case

KVM and Kubernetes

High-Performance Databases

Business Requirements

- Software-defined architecture to simplify operations and reduce costs
- NVMe and persistent storage for Kubernetes
- Scalable (scale up, scale out)
- Flexible, to leverage the most cost-efficient hardware configurations
- Easy to use and manage with automated provisioning
- Agile, to “lift and shift” workloads and allocate storage on an as needed basis
- Tenant-based QoS and volumes allocations

Solution

Lightbits Block Storage on Lenovo ThinkSystem chassis with Intel 4th Gen Xeon Scalable Processors and Micron NVMe SSDs

Business Benefits

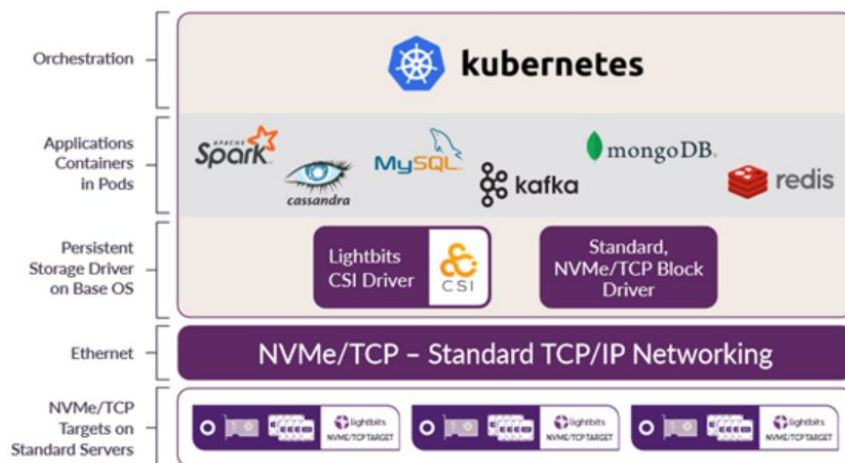
- Flexibility. The system runs on any cloud or hardware configuration enabling the most cost-efficient configurations with seamless K8s integration via CSI plugin.
- Independent Scaling: The ability to scale in any direction.
- Efficiency. Resilient storage at near local flash performance.
- Agility. To move, shift, and allocate storage on an as needed basis

THE SOLUTION

The implementation consists of 10s clusters of 16 dual instance, high-performance servers per datacenter—two instances of Lightbits are run on the same physical machine. This allows Lightbits to get 25-30% higher performance out of a single machine. Each Lightbits node consists of Lenovo ThinkSystem SR650 V2 servers with high-performance Intel® 4th Gen Xeon® Scalable Processors, and Micron NVMe SSDs. This implementation schema delivers performance and data replication advantages. The organization can leverage different replication scenarios for different workloads. By leveraging the data resilience and protection capabilities of Lightbits, the customer was able to consolidate and reduce the number of database instances. This resulted in significant savings on both software licensing and infrastructure costs.

LIGHTBITS ADVANTAGES

NVMe over TCP was invented by Lightbits Labs and it's natively designed into the software providing maximum performance on standard TCP/IP networking offering the industry's best price/performance value. Lightbits seamlessly integrates with Kubernetes, a single Lightbits cluster can support hundreds of K8s clusters without inhibiting K8s container portability model. By moving away from their JBOD/JBOF architecture to a disaggregated, persistent storage such as Lightbits allows their K8s workloads mobility across the entire cluster. When worker nodes fail, the workload can easily start on a different one, thus reducing impact from hardware failures and increasing uptime and availability overall. If a K8s pod moves to a new physical server, the same Lightbits persistent volume will be attached to that new machine and remain available to the pod. Additionally, in contrast to other K8s storage solutions, a single Lightbits cluster can support multiple container orchestration platforms, including Red Hat OpenShift Container Platform (OCP) and OpenStack, as well as bare-metal applications.



Performance Under Pressure

For this e-commerce platform, their annual mega sales event represents a critical moment—millions of transactions are processed over a few days, with intense traffic spikes. With Lightbits, their infrastructure handled record-breaking sales volumes without a single hitch. The seamless performance of Lightbits ensured that no bottlenecks or storage system issues arose, even under the enormous load generated by the sale. Lightbits, inventors of the NVMe over TCP (NVMe/TCP) standard accelerates their database workloads while simplifying operations. More than 250 Lightbits storage nodes power 10s of petabytes of high-performance, low-latency storage, making block storage available to virtually any modern, cloud-native database application.

By utilizing Lightbits' rich data services, such as thin-provisioning and compression, they were able to improve utilization and efficiency enormously compared to their legacy DAS architecture. Lightbits also allows for automated deployment of storage servers and, by the use of snapshots and clones, easily create new compute environments or a clone of their production data for testing and development purposes based on 'golden images'. Additional business and technical benefits realized by this organization:

- **Scalable High Performance:** Up to 1M IOPS per volume and consistent sub-millisecond latency under heavy load, with dynamic scalability.
- **Automation:** Automated provisioning and replication simplifies operations.
- **Flexibility:** The system runs on any cloud or hardware configuration enabling the most cost-efficient configurations.
- **Predictable low cost:** High resiliency and data protection consolidated database instances, reducing licensing and infrastructure costs.
- **Agility:** To move, shift, and allocate storage on an as needed basis and lift and shift workloads. The organization can run any database on Kubernetes with performance, resiliency, and data protection managed by Lightbits.

Building their online retail platform on Lightbits enabled this organization to reduce costs and simplify operations while ensuring their customers a fast, resilient, highly available platform to grow their businesses and provide a positive digital experience.

For more information go to www.lightbitslabs.com.
To get started using Lightbits contact info@lightbitslabs.com.

