

CloudByte Enables Storage Virtualization with the Help of SanDisk® SSDs

Solution Focus

- Storage virtualization
- Storage on demand

Summary of Benefits

- Reliable, secure, manageable storage
- Access to hybrid and all-flash storage pools
- Single storage platform
- Reduced data center footprint
- Reduced cost for storage

Summary

CloudByte is a storage virtualization company that brings the virtualization concept down into the storage layer. This provides “virtual storage machines” (VSMs), which are the equivalent of virtualization on the server. The CloudByte ElastiStor Appliance (ESA), a completely self-managed storage solution, extends server virtualization to the storage component. It does this by employing SanDisk solid state drives for primary storage or hybrid solutions.

Background

Felix Xavier is the founder, CEO, and CTO of CloudByte. Four years ago he observed the proliferation of server virtualization and expected that a similar phenomenon would occur in the storage world. Seizing this opportunity, CloudByte developed advanced technologies to address both storage virtualization and the flexible allocation of storage resources on demand, creating Virtual Storage Machines (VSMs). VSMs are like a physical storage appliance at a logical software level, which can guarantee isolation as any physical appliance can. “We have consolidated everything on a simple, single appliance. We carve virtual containers out of the appliance and provide performance guarantees for each of the applications. This complements what server virtualization does,” explained Xavier.

Xavier initially started the company as a software-only solution. However, CloudByte later developed an integrated hardware appliance, which required that they conduct research on various components, such as servers and flash drives. “We found SanDisk, who provides the enterprise-grade SAS drives that...meet our price and performance point requirements,” said Xavier.

The Challenge

Over the past decade, while virtualization has made rapid strides on the server side, storage technology has experienced only incremental innovations. Many storage systems are constrained by the limitations of scalability, flexibility, and cost, which are characteristic of legacy and proprietary hardware. When servers are virtualized but storage is dedicated, the end result is that only half the infrastructure stack is virtualized, resulting in poor overall resource utilization.

“More and more enterprise applications are moving into the Cloud at the service provider, with the average service provider handling thousands of enterprise applications and hundreds of database instances,” Xavier explained. “A key customer pain point with CloudByte customers is when the database is not getting the necessary IOPS from the underlying storage layer.”

The typical large enterprise has 900 to 1,000 applications. In a typical storage utilization structure, customers have created storage silos for each application. For example, discrete storage deployments are commonly seen for SAP, for MS-SQL, and for MySQL, Oracle, and MS Exchange within one environment. This results in a great deal of unused capacity on those deployments. By consolidating storage, customers can access unused capacity, while guaranteeing performance for each of these applications. The goal: companies need to consolidate all storage deployments on one platform, without losing the performance guaranteed for each of these applications. “A major part of our client base is large service providers—those companies trying to cater to multiple enterprise customers from the same storage platform,” said Xavier. “So, the advantage with solid state storage is that it provides a lot more IOPS and performance on a single platform. Our software...provides the required performance for each one of the customers.”

The key for CloudByte is having the right technology from the right partner on the hardware side. SanDisk provides the high-density drives to meet that requirement.

The Solution

Established in 2011, CloudByte has developed advanced technologies to address both storage virtualization and the flexible allocation of storage resources on demand. The company is the first provider of secure, multi-application storage for enterprise-grade clouds run by public and private service providers.

CloudByte ElastiStor Appliance (ESA), a complete self-managed storage solution, extends server virtualization to the storage component. ESA is a single, extensible storage platform that employs solid state drives (SSDs) and can be easily integrated into a storage grid, defying the limitations of geography and scalability of most storage solutions.

CloudByte offers a hybrid solution, where flash is used to store metadata in order to alleviate timeouts due to metadata crawls. It also offers all-flash configurations, where SanDisk drives are used so multiple applications can run on the same system without competing for underlying storage resources. CloudByte allocates the required resources for these configurations.

For end customers, there are two key advantages. First, customers using an all-flash environment can combine multiple applications into a single platform. Second, for customers using hybrid storage, CloudByte manages flash usage efficiently, so all metadata is stored on flash and the remaining data is stored on hard disk drives.

SSDs offer lower latency for read and write tasks, higher drive writes per day, and greater longevity for writing to the ZFS Intent Log (ZIL). CloudByte ESA can also deploy SSDs for primary storage or utilize SSDs in hybrid systems where hard disk drives are still used for primary storage.

After reviewing many different storage vendors, including Seagate, HGST, and Samsung, CloudByte selected SanDisk as their SSD partner. SanDisk provides a broad portfolio of products with a breadth of capacity points, performance characteristics, and interface selections. In addition, by selecting SanDisk, CloudByte can provide enterprise-level storage at attractive pricing in only 2U of rack space. ESA leverages flash drives for high-performance needs, such as caching and the use of either flash or disk drives for data storage. Up to four expansion chassis can also contain hybrid storage.

“We are using two products from SanDisk,” said Xavier. “The Optimus Eco™ is used for bulk storage of data. The Optimus Extreme™ satisfies write-intensive workloads and cache requirements, supporting the required amount of IOPS and multi-pathing.”

CloudByte customers can now run many applications within a single storage platform, regardless of their in-house storage expertise. A single console allows for storage management and scalability across data centers, by simply adding more ElastiStor appliances.

“SanDisk’s flash and solid-state drive technologies have enabled CloudByte to take enterprise storage virtualization to the next level and guarantee every application in a shared storage array the performance and latency it requires, via policies set through Virtual Storage Machines (VSMs).”

Matt Woithe
Senior Product Marketing Manager,
CloudByte

“SanDisk is providing a great partnership in terms of delivering high-density drives, whether two-terabyte or four-terabyte all-flash drives. They are really helping us to achieve our end goal in terms of providing highly dense storage platforms. We are developing more capabilities in our product, which is going to create more happy customers.”

Felix Xavier,
Founder, CEO, and CTO of CloudByte

“We are pleased to be working with CloudByte to incorporate SanDisk’s high performance, enterprise-class SAS SSDs into their new cloud-based storage system,” said Alper Ilkbahar, Vice President of Marketing, SanDisk Enterprise Storage Solutions. “The foundation of SAS SSDs from SanDisk enables CloudByte customers to safely deliver fast storage services more efficiently, while saving energy, floor space, and—ultimately—money.”

Why CloudByte Chose SanDisk

CloudByte recognized that SanDisk has a longstanding flash memory innovation history. “We didn’t want to reinvent the wheel in terms of flash technology. We wanted to pick out the best-in-class SSD. When conducting our evaluations, our major requirements from a SAS-based SSD were multi-pathing capability in an enterprise grade and reliability,” commented Xavier. “SanDisk was able to deliver the required performance for our appliance at the right price point. In addition, the support from SanDisk is really great, in terms of both technical and marketing support.”

SanDisk continues to produce the high-speed drives and the high-capacity drives that will help CloudByte produce a high-density storage appliance. “We are consistently looking for high density,” Xavier continued. “Our value proposition is that we are able to pack more applications into the high-density flash environment. We need the hardware to support the higher density, which is provided by SanDisk SSDs—512 terabytes in a 3U chassis.”

Advantages of CloudByte

CloudByte’s advanced technology enables end customers to out-compete their competition, due to greater flexibility and cost savings. For example, the CloudByte appliance provides high density in the storage layer to support multiple applications, which translates into a reduced data center footprint. Density is one of the critical factors in the service provider environment, where a given service provider runs hundreds or thousands of applications in the data center on the single appliance. In addition, virtualization provides higher utilization of the underlying hardware resources: virtualizing flash drives allows for packing more applications onto a smaller number of cards. Last, CloudByte customers can realize greater operating expenditure (OpEx) efficiency since fewer system administrators can manage more database instances due to the higher performance and density afforded by ElastiStor appliances.

Flash is an integral part of providing multiple levels of performance tiers. CloudByte customers can provide a wide variety of performance tiers to their end customers—ranging from 12 IOPS per terabyte to 25,000 IOPS per terabyte. In the hybrid model it provides higher performance capabilities with higher capacity.

“In summary, one of the advantages of switching over to the CloudByte VSM model is the ability to pack multiple applications onto the same storage appliance,” explained Xavier. “Some applications are performance-hungry, while other applications are capacity-hungry. By combining these two we are able to effectively utilize the underlying storage platform, thereby increasing the storage virtualization by 5x. That translates into a reduced data center footprint in terms of power and space cooling.”

The Result

CloudByte’s ESA offering enables companies in industries such as higher education, media and entertainment, healthcare, and cloud services to more reliably, securely, and affordably manage their storage infrastructure for thousands of applications in the virtualized data center. Deploying SanDisk SSDs enables CloudByte to provide a 2U storage appliance with a density of 40 terabytes.

By deploying CloudByte’s ESA, enterprises can consolidate their storage infrastructure to a single platform while continuing to run all needed enterprise applications. Like Virtual Machines (VM) in server infrastructures, Virtual Storage Machines (VMS) can now be rapidly deployed to support a Private Cloud or Enterprise Cloud infrastructure, with a defined IOPS per volume. In addition, storage utilization can be

SanDisk Products

- SanDisk 1.6TB Optimus Eco™ SSDs
- SanDisk 100GB Optimus Extreme™ SSDs

CloudByte Products

Three appliance models of ESA have been designed to support a specified number of applications or Virtual Machines.

- ESA-A10: Storage for 10 applications or Virtual Storage Machines
- ESA-A50: Storage for 50 applications or Virtual Storage Machines
- ESA-A100: Storage for 100 applications or Virtual Storage Machines

Flash storage appliances have been refined for the India market:

- ESA-A100S: Offers 6TB (expandable up to 12TB) of usable capacity with up to 100,000 IOPS
- ESA-A100M: Offers 12TB (expandable up to 24TB) of usable capacity with up to 100,000 IOPS
- ESA-A100L: Offers 30TB (expandable up to 60TB) of usable capacity with up to 100,000 IOPS

Contact information

enterprise@sandisk.com

Western Digital Technologies, Inc.

951 SanDisk Drive
Milpitas, CA 95035-7933, USA
T: 1-800-578-6007

Western Digital Technologies, Inc. is the seller of record and licensee in the Americas of SanDisk® products.

SanDisk Europe, Middle East, Africa

Unit 100, Airside Business Park
Swords, County Dublin, Ireland
T: 1-800-578-6007

SanDisk Asia Pacific

Suite C, D, E, 23/F, No. 918 Middle
Huahai Road, Jiu Shi Renaissance Building
Shanghai, 20031, P.R. China
T: 1-800-578-6007

For more information, please visit:

www.sandisk.com/enterprise

SanDisk®

a Western Digital brand

At SanDisk, we're expanding the possibilities of data storage. For more than 25 years, SanDisk's ideas have helped transform the industry, delivering next generation storage solutions for consumers and businesses around the globe.

increased five-fold or greater, without compromising application performance. When needed, enterprises can scale across data centers simply by adding more ElastiStor appliances, while enjoying easy, single-console management across data centers.

Using CloudByte, the service provider can reduce, and in some cases even remove, the efforts of its pre-sales team. "No design is involved with respect to implementing CloudByte. Once the storage platform is set up, the system administrator simply needs to determine the storage to be provisioned, such as 100 IOPS and 100 terabyte capacity," said Xavier. "The underlying storage platform handles the rest. Flash really helps—either as a part of a cache, holding the metadata, or storing data in all-flash configurations."

Recently, CloudByte introduced ESA in India, where rapidly growing businesses are demanding high-performance enterprise storage at an affordable cost. The Company again chose to partner with SanDisk, deploying SanDisk Optimus Eco™ SAS SSDs to power the all-flash and hybrid storage pools. "The flash powered by SanDisk really helps us to pack as many as one hundred applications onto one chassis," explained Xavier. "It is a great cost savings in terms of data center footprint."

Partnership into the Future

CloudByte is optimistic about the opportunities inherent in the growing service provider market. There is growth in multiple geographical locations, including North America, India, and some parts of Japan, where large service providers and large enterprise customers are trying to set up private cloud architectures. In addition, large-scale enterprises are slowly moving towards the web-scale architecture. They want to consolidate underlying storage capabilities and share data among multiple applications.

However, companies need the right partner to produce the high-density storage to serve hundreds of applications. "SanDisk is providing a great partnership in terms of delivering high-density drives, whether two-terabyte or four-terabyte all-flash drives. They are really helping us to achieve our end goal in terms of providing highly dense storage platforms," said Xavier.

CloudByte and SanDisk are anticipating a successful partnership into the future.

"I am excited to develop new products and new technologies in partnership with SanDisk," continued Xavier. "We are planning to release a couple of new appliance versions in collaboration with SanDisk in the coming years, and our customers value the SanDisk drives in our appliance because of the longstanding history of SanDisk in the flash industry. We are developing more capabilities in our product, which is going to create more happy customers."

This partnership has been strengthened due to the performance of the SanDisk drives, both vis-à-vis competitors in benchmarking studies and in live production environments. "We have had a very positive experience working with SanDisk. The team at SanDisk has delivered samples to us and worked together with us on co-marketing activities, as well as on pricing," said Matt Woithe, Vice President, Marketing at CloudByte.

About CloudByte

CloudByte is the first provider of secure, multi-application storage for enterprise applications run by both enterprises and service providers. Its patent-pending technology empowers organizations to spin out Virtual Storage Machines (VSMs) and to scale storage performance higher or lower on demand. Established in 2011 and managed by technology executives from companies such as NetApp, EMC, LSI, Cisco, Juniper, and Novell, CloudByte is headquartered in the Silicon Valley and has a development center in India. CloudByte is venture-backed by Fidelity Worldwide Investment, Nexus Venture Partners, and Kae Capital. A version of CloudByte's ElastiStor OS, that includes a free perpetual license for twenty-five terabytes of storage capacity, can be downloaded from the Community Edition page of the Company's web site.

©2016 Western Digital Corporation or its affiliates. All rights reserved. SanDisk is a trademark of Western Digital Corporation or its affiliates, registered in the United States and other Countries. Optimus Eco, Optimus Extreme and others are trademarks of Western Digital Corporation or its affiliates. Other brand names mentioned herein are for identification purposes only and may be the trademarks of their holder(s).