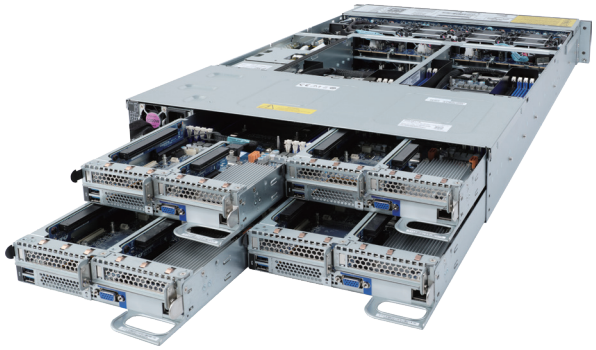
GIGABYTE™

VirtualStor™ Extreme

Ultra-Fast All Flash Software Defined Storage

BIGTERA

GIGABYTE is proud to present a new software defined storage solution in partnership with Bigtera: VirtualStor Extreme, an ultra-high performance all flash storage system that can support up to 800,000 IOPS, a throughput of 10 GB/s, and a latency of consistently 1 millisecond per 2U 4 node appliance, and can scale up to 10M IOPS with 12 appliances, while providing the same excellent flexibility as other products in the VirtualStor family – providing composable storage that fits all environments & applications. Consolidate and migrate your existing legacy storage (SAN and NAS) to VirtualStor Extreme without service downtime, and minimize write amplification and extend the lifetime of your flash storage devices with VirtualStor's unique optimization and management features.

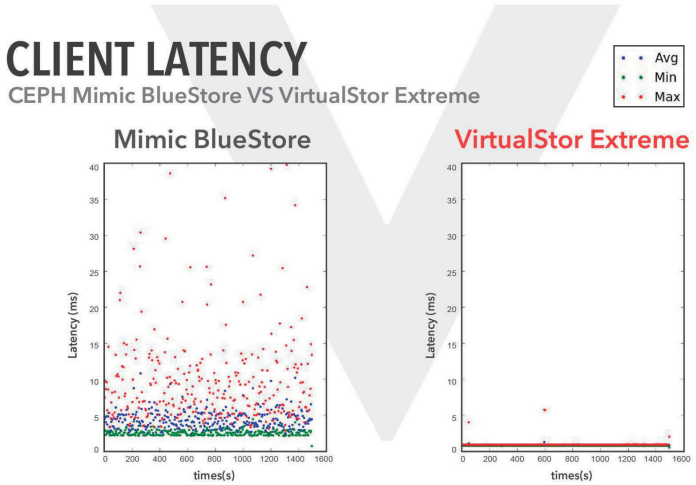


Why VirtualStor™ Extreme

IT administrators constantly suffer from several big concerns, with the foremost being rapid data growth, unacceptably slow response to storage requests, and finding an efficient solution to fulfill their infrastructure needs. VirtualStor™ Extreme is designed to accelerate your fast growing data and various application demands with flexibility, scalability and extreme performance. With up to 800,000 IOPS and 10GB/s bandwidth per chassis and with a scale-out capability, the appliance can perfectly a fit wide range scenarios and business application workloads demanding quick response.

Break Through Performance Bottlenecks

VirtualStor™ Extreme features a high-performance storage engine that significantly increases the I/O performance of a distributed storage system, by using Storage Class Memory (SCM) devices (NVDIMM) and NVMe/SSD as data caching and merging small I/Os into sequential I/Os to further improve IOPS. Data written in NVMe/SSD cache is protected by duplication, preventing data inconsistency from a single NVMe/SSD failure. SSD acceleration technology stores frequently accessed data in the SCM device and NVMe/SSD cache, breaking the bottleneck of scale-out storage systems that are traditionally not good at handling random reads.

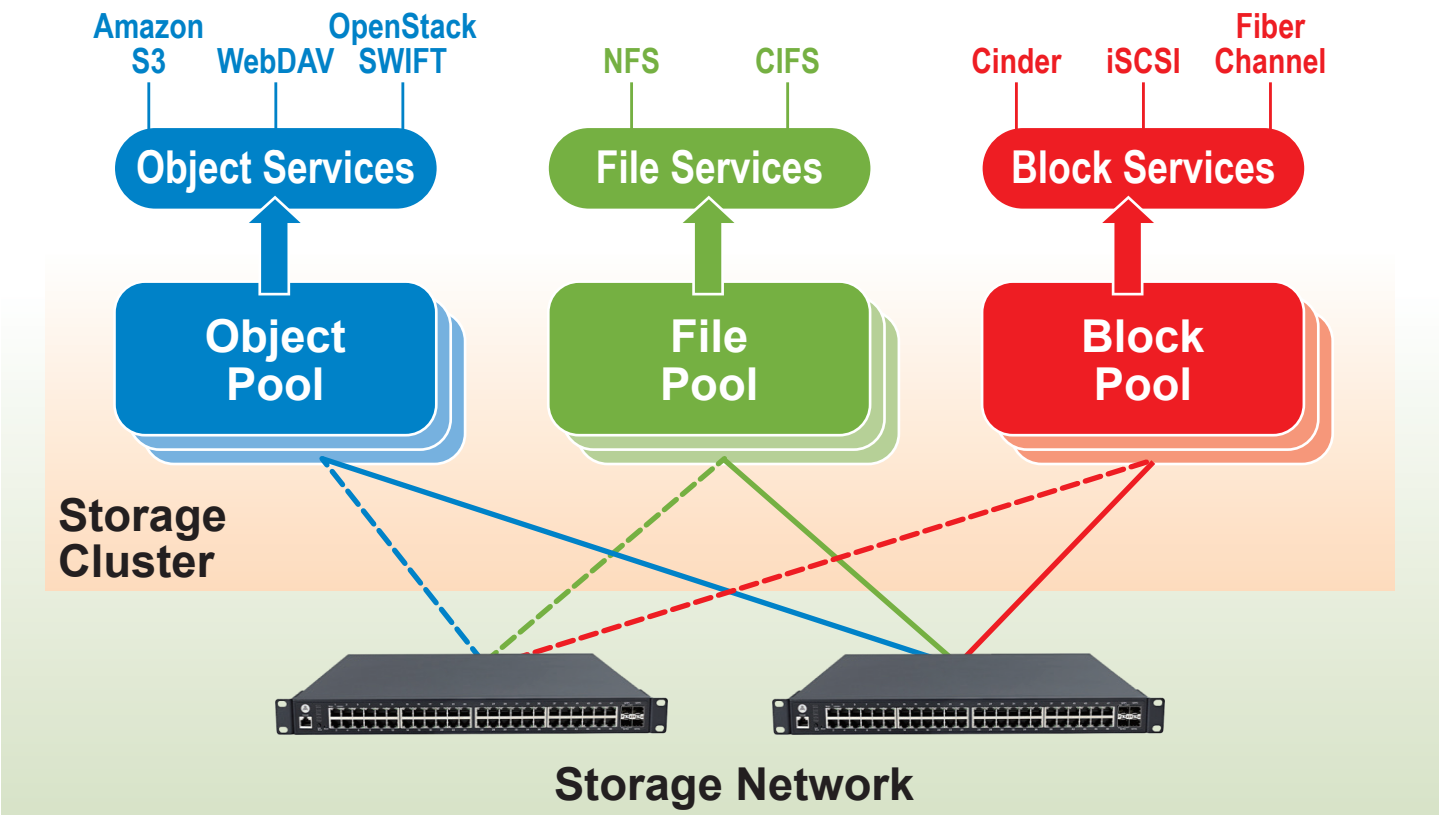


With this technology, VirtualStor™ Extreme performs with stable low random read latency - as low as 1 ms on average, preventing unpredictable latency from impacting business critical applications demanding low and predictable response times. With up to 800,000 IOPS and 10GB/s throughput per chassis, VirtualStor™ Extreme brings blazing fast scale-out storage to fit scenarios like data analytics, high performance computing (HPC) and media broadcasting 4K streaming application workloads.

Unify Your Storage Islands

Over time data centers become a mix and match of many different types of storage (SAN, NAS, DAS etc.). This is due to budgets, availability of storage devices, immediate resource needs, and storage requirement needs. Mixing and matching storage types makes management far more complex as more and more storage devices become part of the data center. VirtualStor™ Extreme provides a unified storage platform, consolidating any type of traditional storage (SAN, NAS, and DAS) into a single massive storage entity, with Bigtera's unique storage virtualization technology. As more appliances are added, the appliances seamlessly become part of a single massive decentralized storage entity.

VirtualStor™ Extreme can be partitioned into storage of any type by abstracting the storage hardware from the control layer and supports creating network attached storage (NAS) and storage area networks (SAN) that can run simultaneously. These storage types are supported by several storage protocols: iSCSI / FC (SAN), CIFS / NFS (NAS), OpenStack Cinder RBD and Amazon S3 / Open-Stack Swift (Object Storage).



Legacy Storage Consolidation and Migration

During the storage purchase and upgrade process, IT management teams are often concerned about data silos caused by data spread across different storage systems from various vendors/technologies. However, it's also hard to justify the cost of replacing legacy storage systems which have run out of space when those systems are still good to work.

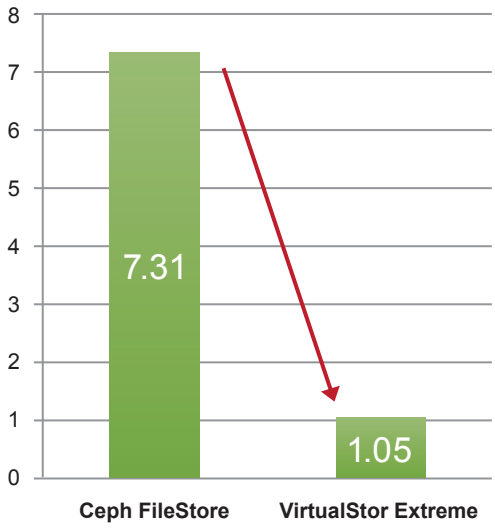
VirtualStor™ Extreme seamlessly migrates data to the new storage system without service down time. The application data is available even during the migration process. VirtualStor™ Extreme also features data consolidation to consolidate existing legacy storages (SAN, NAS, DAS) from any vendors into a single, massive, logical storage infrastructure so that money spent on legacy storage systems won't be wasted.

Squeeze Out Maximum Capacity

VirtualStor™ Extreme can use two replica copies or N+M Erasure Coding, to provide more efficient space utilization than other software defined storage with 3 replica copies. Administrators can also assign various services on Bigtera's unique multi-tenant storage technology "Virtual Storage" to virtually extend the available space and enable compression for backup or archiving. VirtualStor™ Extreme also automates efficient optimization of storage resources: Thin Provisioning functionality provides resources just as they are needed, and storage resources are balanced across storage nodes, so no single node carries more than their fair share of the load.

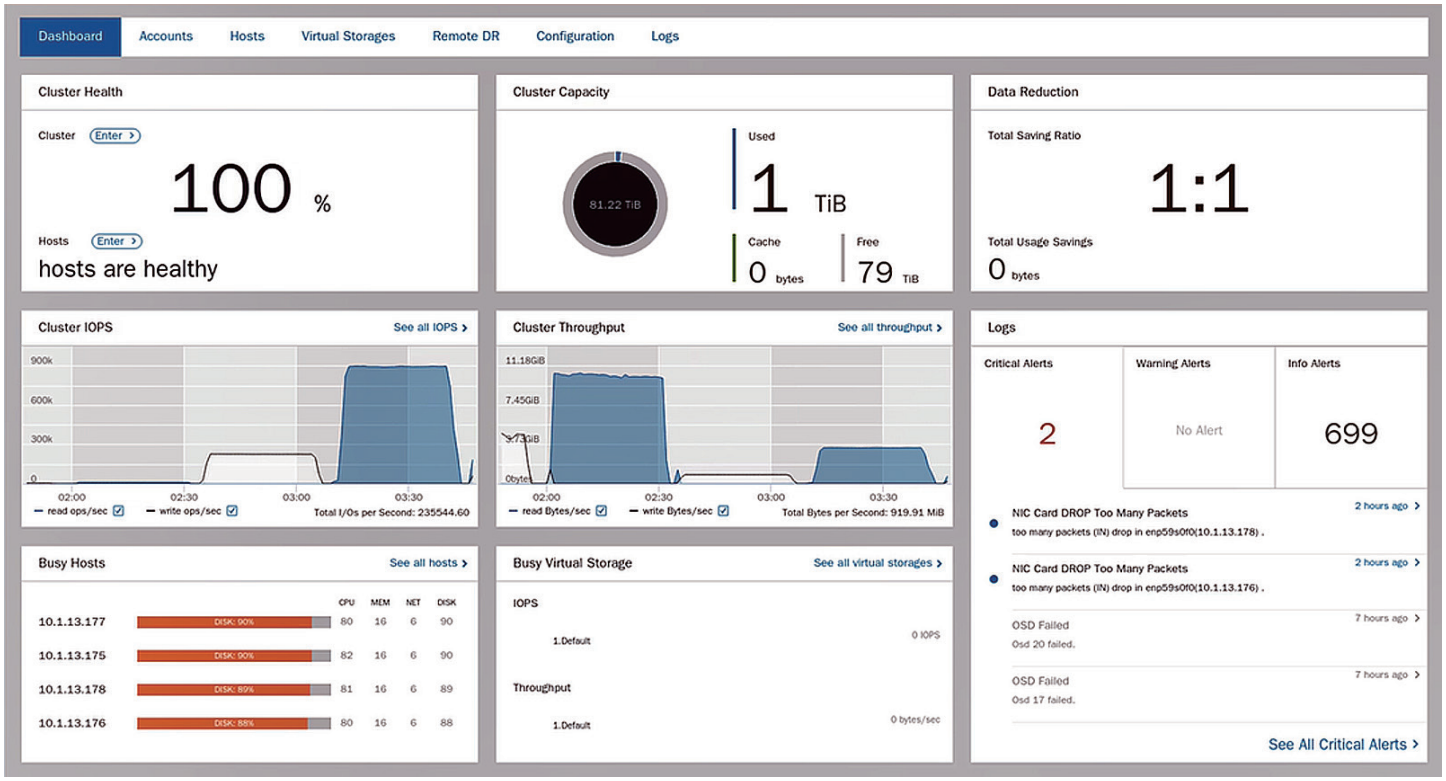
VirtualStor™ Extreme also optimizes SSD usage, using Storage-Class Memory and a new generation of caching algorithm optimization techniques to minimize SSD write amplification, reducing write wear and extending SSD service lifetime. VirtualStor™ Extreme can also notify the administrator when SSD life is running out and predict storage capacity and performance. These features help an administrator to plan ahead and decrease management headaches.

Minimum Write Amplification (WA)



Easy & Powerful Management

VirtualStor™ Extreme features flexible and easy management of storage pools. With customizable size and number of pools and quota management, VirtualStor™ Extreme fits all kind of scenarios fulfilling the various business demands of enterprises. Service downtime caused by data migration due to storage replacement is a major headache to IT administrators. VirtualStor™ Extreme seamlessly migrates data from legacy storage (NAS, iSCSI or FC) in the background with no downtime. All data is available any time during migration even if it has not yet been migrated to VirtualStor™ Extreme.



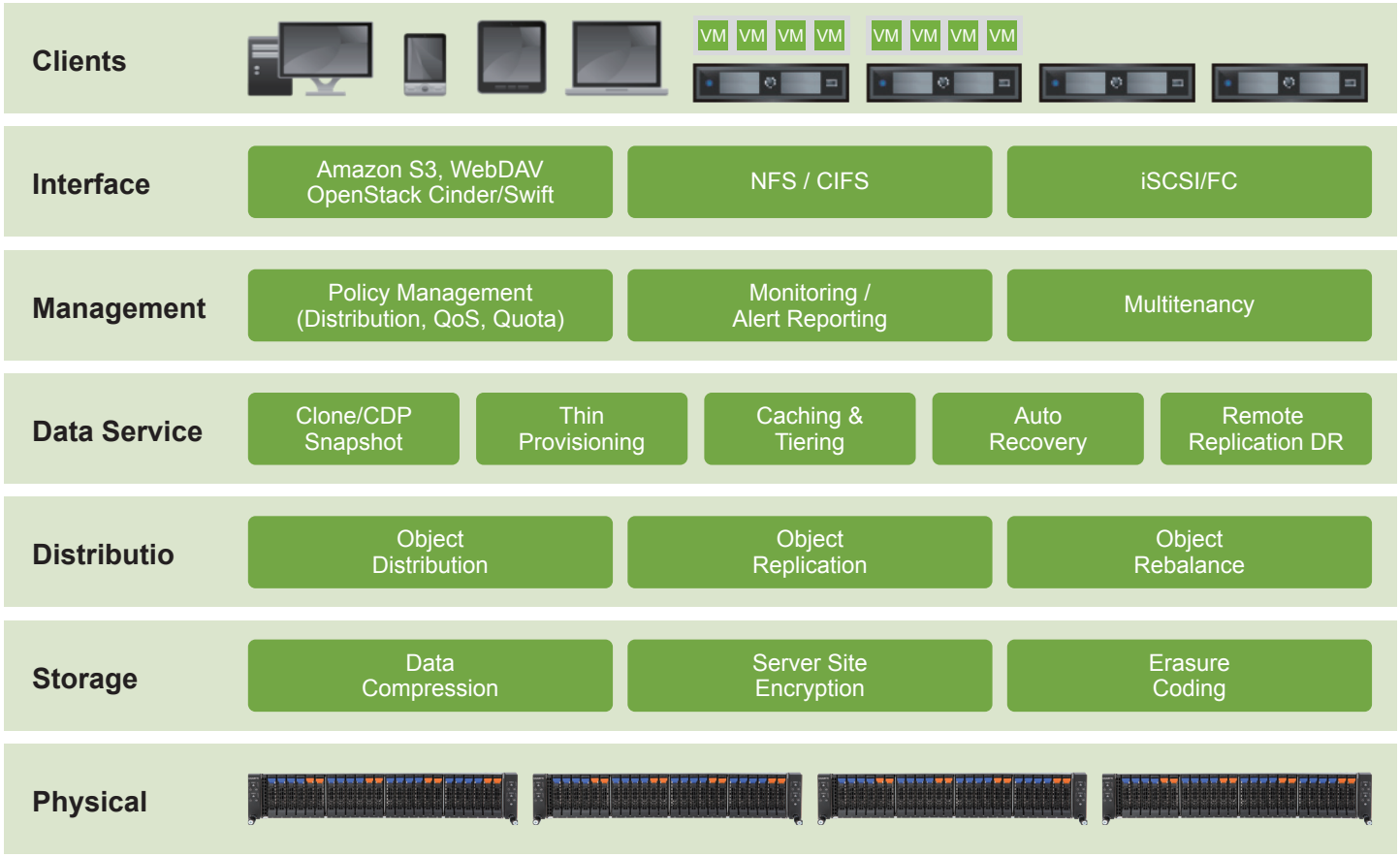
100% Protection & Availability

VirtualStor™ Extreme data availability functions include data replication, erasure coding and self-repairing features. Erasure coding offers administrators an alternative to data replication, to ensure that there is no single point of failure for any of the data blocks. VirtualStor™ Extreme uses round-robin DNS and IP takeover services. Round-robin DNS uses a list of IP addresses for workload balancing - if any of the appliances encounter issues, the remaining appliances seamlessly take over application and workload services by taking over the IP of the appliance that encounters issues. VirtualStor™ Extreme object storage can support Server-Side Encryption (SSE) to protect the object data stored with S3 API and uses Intel® AES-NI encryption technology to accelerate Server-Side Encryption (SSE). Encryption can be enabled for critical data or applications, while data that has a lower level of confidentiality can be left unencrypted.

Total Flexibility

Users can utilize VirtualStor™ Extreme to unify and extend the capacity of their existing storage systems or can seamlessly migrate data from their legacy storage devices to build a new storage system almost without any service downtime. Users can set up a new VirtualStor™ Extreme storage system with as little as 2U of rack space and 23TB of storage capacity or can scale out to achieve multi-petabyte storage capacity.

VirtualStor™ Extreme Architectural Overview



Comparison with Other All Flash Array/SDS

VirtualStor™ Extreme	Other All Flash Array / SDS
☑ Scale-out architecture with SAN/NAS/Object protocols	☐ Scale-up architecture with limited storage protocols
☑ Software Composable Infrastructure to provision Storage based on highly dynamic business workloads.	☐ Predefined infrastructure and lack of agility to adapt highly dynamic business demands.
☑ Reduces TCO by seamlessly migrating old data and consolidating existing storage along with all flash.	☐ Only stores data. Not able to migrate or consolidate existing data.
☑ Offers much longer SSD lifespan by minimizing write amplification with Bigtera I/O engine.	☐ SSDs easily wear out due to huge write amplification.
☑ Ultra-high performance with stably low latency. High Quality of Service.	☐ Unpredictable latency and responses. Poor Quality of Service.

H261-H61 Specifications

Description	All-flash scale-out storage
Use Case	• Digital media and broadcasting: 4K video, video streaming, and post-production • Electronic Design Automation (EDA) • AI and High Performance Computing (HPC) • DNA Sequence Data Analytics
Storage OS	Bigtera VirtualStor™ Extreme
Protocol Support	NFS / CIFS / iSCSI / FC / Amazon S3 / OpenStack Swift / Cinder RBD
Raw Capacity Per Chassis	23.0TB (20.9TiB) to 92.2TB (83.9 TiB)
Rack Height	2U
Nodes Per Chassis	4
Processors	2nd Gen. Intel® Xeon® Scalable and Intel® Xeon® Scalable Processors
Drives Per Chassis	24
Drive Capacity	960GB, 1.92TB, or 3.84 TB
Network Per Node	4 x 10 GbE / 4 x 25 GbE / 4 x 40 GbE
Throughput Per Chassis	10 GB/s
IOPS Per Chassis	800,000 @ 1ms latency

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