



GIGABYTE™



VirtualStor™ Scaler

High Performance Unified Scale Out Storage Platform

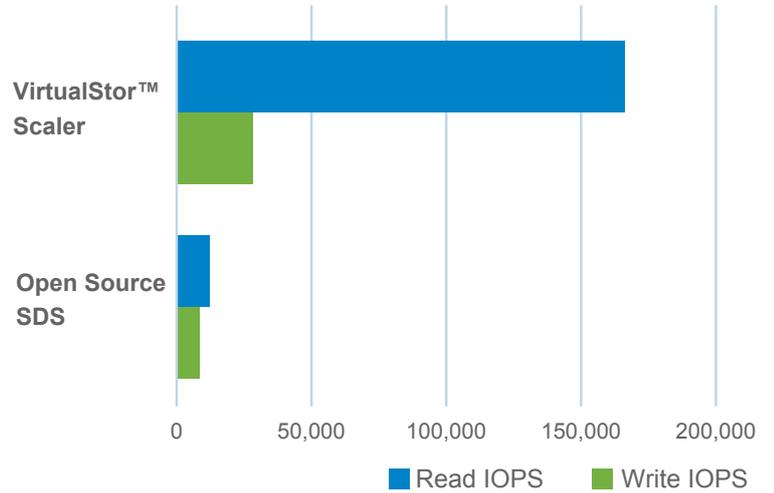
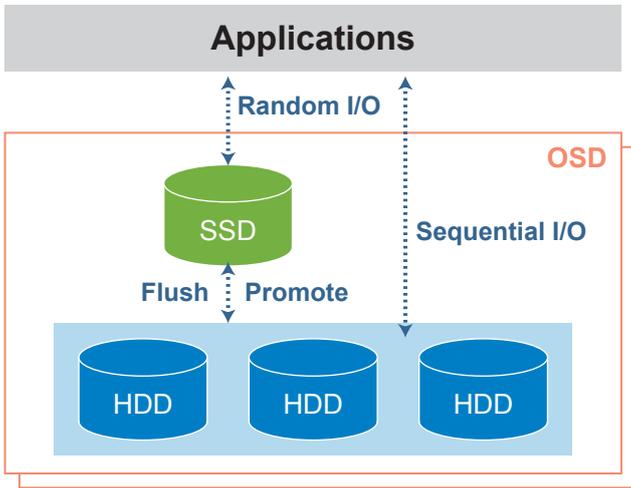


GIGABYTE has joined forces with Bigtera to offer a high performance software defined storage package: VirtualStor™ Scaler, utilizing a scale-out architecture to eliminate over-provisioning, bring resource costs under control, and eliminate capacity planning. GIGABYTE servers have been fully validated and tested with VirtualStor™ Scaler to offer a complete hardware / software turnkey storage solution that is ready for fast and easy deployment into your data center.

Performance

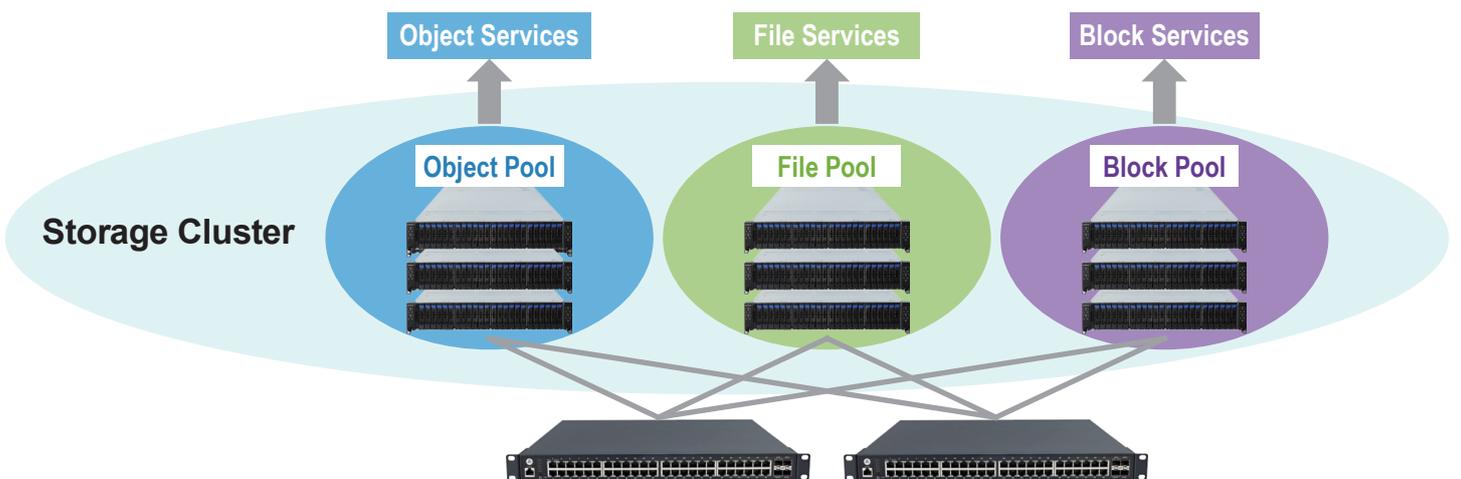
VirtualStor™ Scaler features a high-performance back-end storage engine – BigteraStore – that significantly increase the I/O performance of a distributed storage system by using SSD to support cache and log storage for random I/O, breaking the bottleneck of scale-out storage systems that are traditionally not good at handling random reads.

VirtualStor™ Scaler also features SSD acceleration technology such as data caching and merging small I/Os into sequential I/Os to further improve IOPS. Running on GIGABYTE server hardware, featuring Intel® Xeon® Scalable processors and 10GbE to 100GbE network connectivity to maximize the compute and networking resources required for high I/O and throughput, VirtualStor™ Scaler brings blazing fast scale-out storage to your data center.



Unification

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™ Scaler 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.

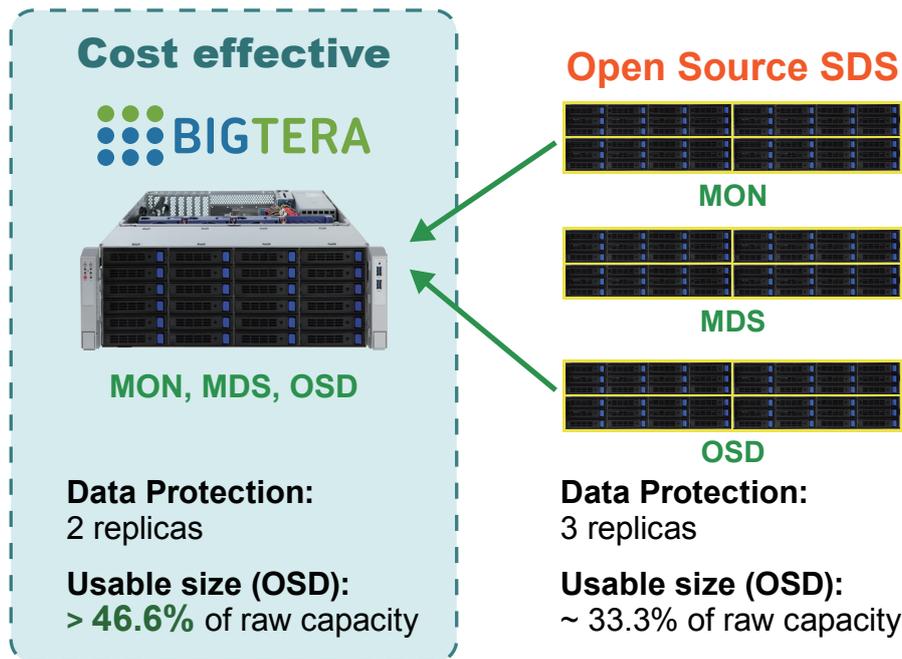


VirtualStor™ Scaler can be partitioned into storage of any type by abstracting the storage hardware from the control layer, and supports creating network attached storage (NAS) and storage area networks (SAN) that can run simultaneously. These storage types are supported by several storage protocols: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

Efficiency

VirtualStor™ Scaler can use RAID-5 together with two replica copies or N+M Erasure Coding, so as 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 and data deduplication for backup or archiving. VirtualStor™ Scaler 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™ Scaler also optimizes SSD usage, using a new generation of algorithm optimization techniques to minimize SSD write amplification, reducing write wear and extending SSD service lifetime. VirtualStor™ Scaler 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.



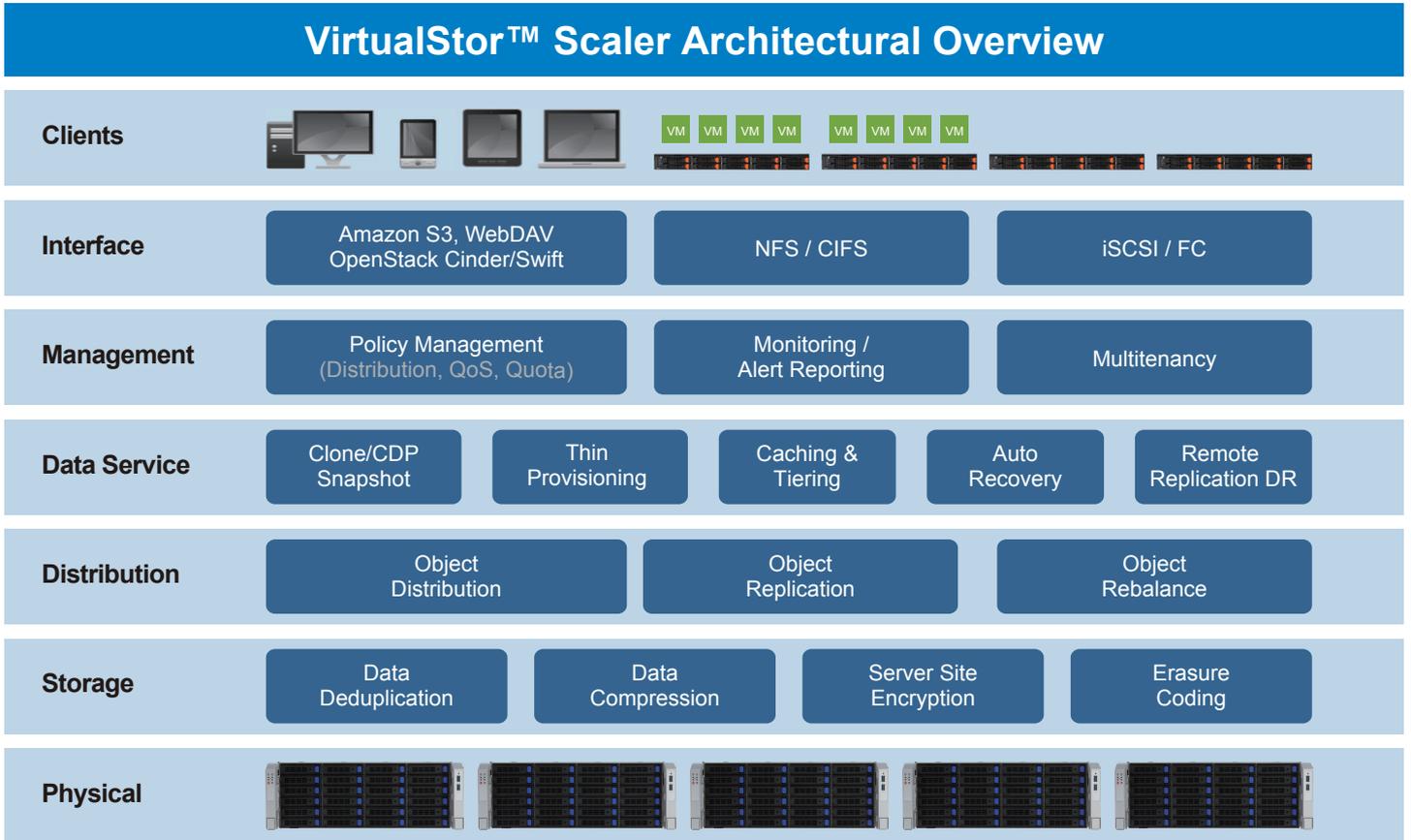
All in One Platform - Cost effective
(Bigtera SDS vs Open Source SDS)

Availability

VirtualStor™ Scaler data availability functions include data replication, erasure coding, self-repairing, and RAID 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™ Scaler 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 take over application and workload services seamlessly by taking over the IP of the appliance that encounters issues. VirtualStor™ Scaler 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.

Flexibility

Users can utilize VirtualStor™ Scaler 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™ Scaler storage system with as little as 3U of rack space and 48TB of storage capacity, or can scale out to achieve multi-petabyte storage capacity.



Comparison with Traditional/Scale-up NAS

Bigtera VirtualStor™ Scaler	Traditional/Scale-up NAS
<input checked="" type="checkbox"/> Scale-out architecture with SAN/NAS/Object multiple protocols in one cluster	<input type="checkbox"/> Traditional scale-up architecture with limited storage protocols
<input checked="" type="checkbox"/> Cost-effective. Supports standard X86 infrastructure and mainstream HDD and SSD.	<input type="checkbox"/> Hardware vendor lock-in. Only supports specific hardware, HDD and SSD.
<input checked="" type="checkbox"/> Minimizes write amplification and offers much longer SSD lifespan with Bigtera storage I/O engine	<input type="checkbox"/> Huge write amplification. SSDs easily wear out.
<input checked="" type="checkbox"/> Performance and capacity both scale-out. Performance is truly linear & predictable.	<input type="checkbox"/> Scale-up capacity only. Performance bottleneck at scale.
<input checked="" type="checkbox"/> Consolidate existing storage together with all flash. Seamlessly migrate old data to save TCO.	<input type="checkbox"/> Only can store data. Not able to migrate or consolidate existing storage. Not able to be the cache layer for existing storage.

Bigtera VirtualStor™ Scaler vs. Open Source SDS

	Bigtera VirtualStor™ Scaler	Open Source SDS
Supports SAN protocols	iSCSI and FC	iSCSI only
Supports NAS protocols	NFS and CIFS	NFS only and still in tech preview
Supports file access protocols to bucket	NFS and CIFS	NFS only and still in tech preview
Supports WebDAV	✓	✗
API which is compatible with Amazon S3 and OpenStack Swift	✓	✓
OpenStack integration	✓	✓
Multi-Tenant Storage	✓	✗
Seamless data migration from legacy storage	✓	✗
Consolidate legacy storage space	✓	✗
QoS policy for file, folder, and volume	✓	✗
Folder quota / volume quota policy	✓	✗
Deployment	No need for any extra monitor nodes	Need to install 3~7 extra monitor nodes
Data deduplication	✓	✗
Data compression	✓	✓
Real-time replication	✓	✓
N+M erasure coding	✓	✓
Snapshot and cloning	✓	✓
Self-repairing	✓	✓
Load rebalancing	✓	✓
Recovery optimization	Incremental Recovery and Recovery QoS	✗
Supports VAAI	✓	✗
ISO installation package	✓	✗
Decentralized management console	✓	✗
Remote backup	<ul style="list-style-type: none"> • Volume to volume • Folder to folder • Folder to bucket • Bucket to bucket 	Only bucket to bucket
Cloud backup to Amazon S3 compatible service	✓	✗
Open management API	✓	✗
Windows AD integration	✓	✗
SSD optimization	<ul style="list-style-type: none"> • SSD acceleration • SSD life prediction • Reduces write amplification to extend SSD life 	Just supports SSD and not optimized for SSD characteristics
Capacity and performance prediction	✓	✗
Multiple file systems	✓	✗
Notification support	Email, SNMP, (WeChat)	Email
Backup system configuration	✓	✗
iSCSI/FC initiator groups	✓	✗
Rack awareness	✓	✓



Solutions	40 TB	100 TB	300 TB	600 TB	2.5 PB	4 PB
Component	3 x R181-340	3 x R281-3C1	3 x S451-3R0	6 x S451-3R0	8 x S461-3T0	8 x S461-3T0
Usable Capacity*	48 TB	120 TB	348 TB	696 TB	2688 TB	4032 TB
Storage Software	Bigtera VirtualStor™ Scaler 7.0					
Protocol Support	NFS / CIFS / iSCSI / FC / Amazon S3 / OpenStack Swift / Cinder RBD					
CPU	Dual 2nd Gen. Intel® Xeon® Scalable Family processors					
Memory	Up to 1.536 TB 2933 MHz(1DPC) RDIMM / LRDIMM			Up to 1.024 TB 2933 MHz(1DPC) RDIMM / LRDIMM		
Data Disk	8 TB Enterprise HDD	8 TB Enterprise HDD	8 TB Enterprise HDD	8 TB Enterprise HDD	14 TB Enterprise HDD	14 TB Enterprise HDD
Cache Disk	SATA SSD	NVMe SSD	NVMe SSD	NVMe SSD	NVMe SSD	NVMe SSD
Network	1GbE / 10GbE	10GbE / 25GbE	10GbE / 25GbE	10GbE / 25GbE	50GbE / 100GbE	50GbE / 100GbE
BMC	Aspeed® AST2500					
PSU	Dual 1200W 80 PLUS Platinum redundant					
Disk Protection		RAID-5	RAID-5 with global hot spare	RAID-5 with global hot spare	RAID-5	RAID-5
Object Replication	2 Replicas	2 Replicas	2 Replicas	2 Replicas	2 Replicas	Erasure Coding

* Includes over provisioning space for self-healing



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